RCPCH Audits



National Neonatal Audit Programme

A guide to the 2023 audit measures

January 2024, v1.2

NNAP
National Neonatal Audit Programme

RCPCH
Royal College of Paediatrics and Child Health
Leading the way in Children's Health

HQIP
Healthcare Quality Improvement Partnership

National Neonatal Audit Programme (NNAP): A guide to the 2023 audit measures

The NNAP is run by the Royal College of Paediatrics and Child Health (RCPCH) and commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). More information about the Programme can be found at: www.rcpch.ac.uk/nnap

This document sets out the details of the 2023 NNAP audit measures and describes the following details for each measure:

- NNAP audit measure
- Changes to the audit measure for 2023 data
- NNAP standard and source of standard
- Inclusion criteria
- Attributing results
- Deriving outcomes
- Where the required data should be entered on BadgerNet

Version control table

Version	Publication date	Comments
V1.0	January 2023	Version 1 published
V1.1	June 2023	Updates applied following final sign-off by NNAP commissioners of 2023 metrics.
V1.2	January 2024	Updated denominator text to account for missing cases. Updated clinical outcomes composite metric to clarify that PHVD is not included. Updated place of birth attributions to improve accuracy and clarity. Updated information relating to outlier identification and management.

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About the NNAP dataset and methodology

The RCPCH receives the data contained in the NNAP dataset directly from Clevermed Ltd, provider of the BadgerNet clinical system. The NNAP team processes data that is required solely for care quality and service improvement in relation to the aims and scope of the NNAP. Neonatal unit staff enter data onto the BadgerNet platform as part of routine care whilst a baby is present on the neonatal unit and this data is stored by Clevermed Ltd. Data items contained within the NNAP dataset are synchronised to an NNAP database hosted by the RCPCH. Patient identifiable data is pseudonymised before analysis is conducted by the NNAP team. The RCPCH has approval to receive patient identifiable data without consent for England and Wales under Healthcare Research Authority (HRA) Confidentiality Advisory Group (CAG) Section 251 support (ref: 21/CAG/0007), for Scotland under the Health and Social Care Public Benefit and Privacy Panel (HSC-PBPP) support (ref: 2122-0254), and for the Isle of Man as approved by the Isle of Man Dept. of Health and Social Care and Information Commissioner.

NNAP data dictionary

The NNAP dataset is defined in the NNAP data dictionary, available at: https://www.rcpch.ac.uk/work-we-do/clinical-audits/nnap/data-flow

Inclusion criteria

The following inclusion criteria apply to all NNAP measures:

- Babies who were admitted to a neonatal unit for neonatal care (not including babies that only had transitional care, observational or postnatal ward care).
- Babies born at a gestational age of 22 weeks or more
- Babies who had care provided by an NNAP unit
- Babies whose parents or carers have not opted them out of secondary use of their data for the purpose of the NNAP*

Further criteria specific to each audit measure can be found in the measure descriptions.

* *The National Data Opt Out (which allows patients in England to opt out of their information being used for purposes beyond their direct care) does not apply to the National Neonatal Audit Programme. This is because applying the National Data Opt Out would introduce biases to the data and jeopardise patient safety. A patient can still be opted out from the NNAP via a project specific mechanism. For more information, please see: https://www.rcpch.ac.uk/resources/national-neonatal-audit-programme-privacy-notices-your-babys-information*

Case ascertainment

In usual practice, every baby admitted to a participating neonatal unit is entered on the BadgerNet patient record system and is eligible for inclusion in the NNAP; the audit therefore expects to achieve 100% case ascertainment in the participating organisations, excluding babies whose parents have chosen to opt them out of secondary use of their data for the purposes of the NNAP. Babies receiving special care in transitional care areas or postnatal wards can also be entered, but it is known that some units do not enter data for such babies and for this reason measures exclude babies who do not spend any time on a neonatal unit.

Data collection period

The cohort of babies included in the 2023 audit year are babies who are either born, experience their first neonatal admission, final neonatal discharge or turn 44 weeks post menstrual age (PMA) in the calendar year 1 January 2023 to 31 December 2023, depending on the measure. The exception to this is the dataset used for two-year follow-up, the cohorts for which are set out in the measure description.

Describing gestational age

Gestation refers to “completed weeks” of gestation, based on the best available estimate recorded by clinical staff in BadgerNet. Gestation is typically described in bands – where we refer to all babies born at less than 32 weeks, we mean all babies with a gestation at birth of up to 31 weeks and six days inclusive. Where we refer to 23-33 weeks inclusive, we mean to include all babies with a gestation at birth of 23 weeks and 0 days to babies with a gestation at birth of 33 weeks and 6 days.

Two measures of age are used within the NNAP audit, corrected age and post-menstrual age. When describing post-menstrual age of babies, we mean the chronological age of the baby plus gestation at birth. Corrected age of babies is defined as chronological age minus prematurity at birth. For example, a baby born at 32^{+0} weeks gestational age is 8 weeks premature, at 9 weeks of life, this baby would have a post-menstrual age of 41 weeks and a corrected age of 1 week post term.

1 Mortality to discharge in very preterm babies

Does a baby born between 24 weeks' and 31 weeks' gestational age inclusive die before discharge home, or 44 weeks' post-menstrual age (whichever occurs sooner)?

Note: Babies discharged to a hospice for palliative care (such as for compassionate extubation) and who die prior to 44 weeks' postmenstrual age are counted in the numerator.

Change to the audit measure for 2023 data year: The NNAP will additionally report mortality at 22 and 23 weeks gestational age, however this group will not be included in reporting against the improvement goal. From 2023, the NNAP will report mortality on 1 year epochs. Previously the NNAP reported three-year rolling epochs.

NNAP standard

Developmental standard: None

Subject to outlier identification: No Inclusion criteria

Number of babies admitted to a neonatal unit whose birth gestation was 24 to 31 weeks' inclusive (22 weeks and 23 weeks for additional reporting).

Denominator: Number of babies admitted to a neonatal unit whose birth gestation was 24 to 31 weeks' inclusive. Babies who are recorded as having died, but who do not have a recorded date of death, will not be included, and are recorded as missing.

Numerator: Deaths of babies 24 to 31 weeks' gestation inclusive, before discharge from hospital to home, or discharge for palliative care with agreed non-intervention plan in place followed by death prior to 44 weeks post-menstrual age (e.g. ventilated baby discharged to a hospice). In hospital, deaths in units not submitting data to the NNAP will be included. Mortality at or after 44 weeks postmenstrual age will be excluded.

Cohort: Babies who turned 44 weeks PMA in the calendar year of interest.

Attribution

The NNAP will report mortality on 1-year epochs. Attribution will be to network of birth. When the place of birth is listed as *Home* or *Transit*, place of birth will be assigned to the Network related to the first unit of first admission.

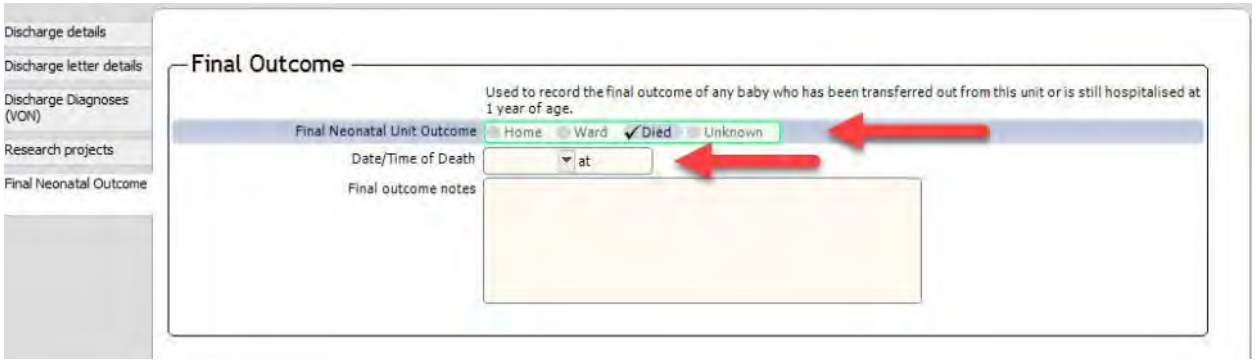
Deriving outcomes

Raw national and network mortality rates will be published alongside network treatment effects. No data is published for individual units.

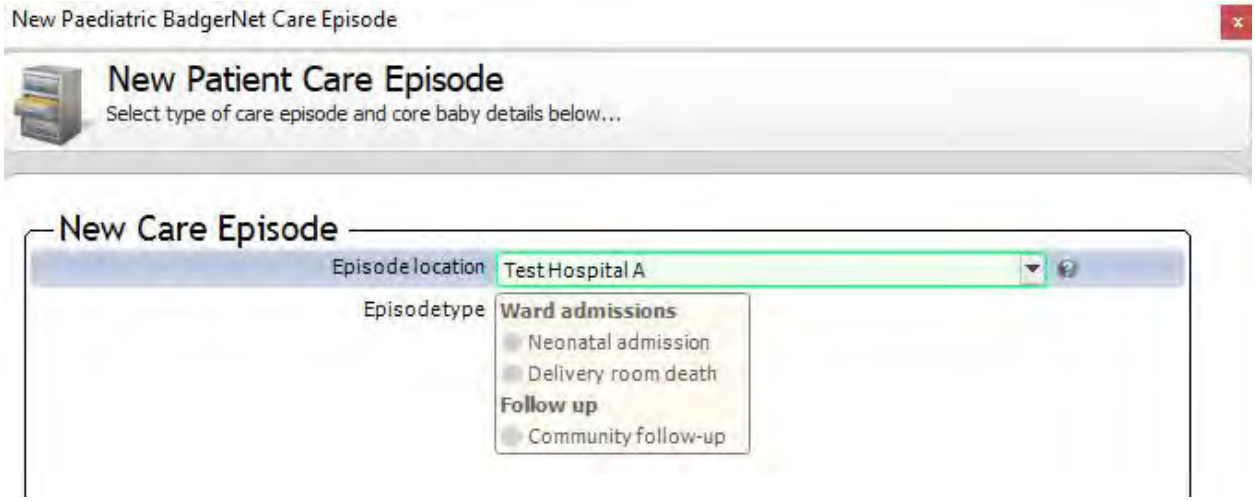
Case mix adjustment: For limited variables, including gestation, gender, multiplicity and ethnicity but neither antenatal steroid administration nor congenital anomalies.

BadgerNet data source

Use the *Final Neonatal Outcome* page to record deaths that occur at non-NNAP units, along with the date and time of death. Please ensure that you click save and close to ensure that any outcomes recorded by another unit using BadgerNet but not participating in the NNAP are recorded.



The NNAP mortality analysis will only include babies admitted to neonatal units, in the first instance. However, we would like units to report liveborn but not admitted deaths using BadgerNet at gestations down to, and including, 22 weeks. Only the briefest of details are required to complete a “delivery room death” admission in place of a “neonatal unit admission”.



Additional information

Rationale

Mortality is a vitally important outcome of neonatal care: reporting adds to the NNAP’s perspective on neonatal services. The NNAP reports on mortality to discharge of admitted babies. This definition may facilitate quality improvement of care within the neonatal unit.

2 Optimal perinatal care composite metric

Does a baby born at less than 34 weeks gestational age receive all reported perinatal optimisation measures (appropriate to their gestational age at birth)?

Change to the audit metric for the 2023 data year: New metric derived from existing individual measures already reported by the NNAP. No additional data collection.

NNAP standard

Developmental standard: None, initially benchmarking only for the new metric.

Subject to outlier identification: No.

Inclusion criteria

Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 33 weeks inclusive. For multiple births, each baby will be included. Babies will be measured against each of the measures for which they are eligible, (based on e.g. gestational age) this means that some babies will not be measured against all six measures.

Denominator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 33 weeks inclusive and who have either:

- recorded outcomes for all the component measures for which they are eligible or;
- have at least one non-adherent outcome.

Numerator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 33 weeks inclusive and who are adherent for all the component measures for which they are eligible.

Cohort: Babies who experienced their first neonatal admission in the calendar year of analysis.

Attribution

Results will be reported for each hospital of birth and network of birth.

When the place of birth is listed as *Home* or *Transit* the hospital and network will be assigned as the provider of their earliest episode. When the place of birth is the site of a closed unit known to be within a network, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

As this is a composite metric, babies will be measured against each of the following 6 measures for which they are eligible:

- Antenatal steroids
- Antenatal magnesium sulphate
- Birth in a centre with a neonatal intensive care unit (NICU)
- Deferred cord clamping
- Promoting normal temperature on admission
- Breastmilk feeding in the first 2 days of life

As there is variation in the inclusion criteria for these measures, not all babies are eligible for all 6 of them. Babies will only be measured against measures for which they are eligible.

Babies will be counted as *complete* if they have a complete status for **all** the measures for which they are eligible.

Babies will be counted as *missing* if they have a *missing* status for **any** of the measures for which they are eligible and no *non-adherent* status for the measures for which they are eligible.

Babies will be counted as non-adherent if they have **at least one** *non-adherent* status for the measures for which they are eligible.

2.1 Antenatal steroids (component measure)

Does a mother who delivers a baby between 22 and 33 weeks' gestational age receive a full course of antenatal corticosteroids within 1 week prior to delivery?[1]

Change to the audit measure for the 2023 data year: None. For 2022 reporting this measure was amended to look at whether a mother receives an appropriately timed full course of antenatal corticosteroids where previously it looked at whether a mother received at least one dose of corticosteroid before delivery. The cohort has been changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis. For continuity, both measures will be run for the first year. The lower gestational age cut-off has been extended to include babies born from 22 weeks gestational age, in line with the overall NNAP inclusion criteria. Please refer to the 2021 measures guide for a definition of the previous measure.

NNAP standard

Developmental standard: None, initially benchmarking only for the new measure looking at administration of a full course.

Subject to outlier identification: No.

Comparison standard for outlier analysis: NA

Inclusion criteria

Mothers of babies between 22 and 33 weeks gestational age. Only data from the first known episode of care will be considered for analysis. For multiple births, only one baby will be included so that each mother is only counted once per delivery.

Denominator: Number of mothers of babies between 22 and 33 weeks gestational age with complete antenatal steroid data.

Numerator: Number of mothers of babies between 22 and 33 weeks gestational age who received a full course of antenatal corticosteroids within 1 week prior to delivery.

Cohort: Babies who experienced their first admission in the calendar year of analysis.

Attribution

Results will be reported for each hospital of birth and network of birth.

When the place of birth is listed as *Home* or *Transit* the hospital and network will be assigned as the provider of their earliest episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

NNAP will use data from steroids last dose timing, steroids given and steroid courses to determine if the baby's mother received a full course of antenatal steroids within 1 week of birth (Table 1 and Table 2). When multiple births present different data, data will be taken from the baby with "the most positive"* outcome.

**Most to least positive: timely completion, incomplete, missing data.*

When the steroids last dose timing indicates that the last dose of steroids was given earlier than 7 days before birth, this will be categorised as incomplete.

When the steroids last dose timing indicates that the last dose of steroids was given after birth, this will be listed as incomplete.

When the steroids last dose timing has no data entered, Table 1 will be used to derive outcomes.

When the steroids last dose timing is within 7 days of birth, Table 2 will be used to derive outcomes.

Table 1. Categorising data for antenatal steroids from BadgerNet fields steroids given and steroids courses when steroids last dose is not entered.

Time of last steroid dose - Not entered			
Steroids given?	**Course complete?**		
	Yes	**No**	**Unknown/not entered**
Yes	Missing	Incomplete	Missing
No	Missing	Incomplete	Incomplete
Unknown/Not entered	Missing	Incomplete	Missing

Table 2. Categorising data for antenatal steroids from BadgerNet fields steroids given and steroids courses when steroids last dose is within 7 days of birth.

Time of last steroid dose - Within 7 days of birth			
Steroids given?	**Course complete?**		
	Yes	**No**	**Unknown/not entered**
Yes	Timely completion	Incomplete	Missing
No	Timely completion	Incomplete	Missing
Unknown/Not entered	Timely completion	Incomplete	Missing

BadgerNet data source

Data from the *Pregnancy Details* page, for *Steroids during pregnancy* will be used to determine if antenatal steroids were given.

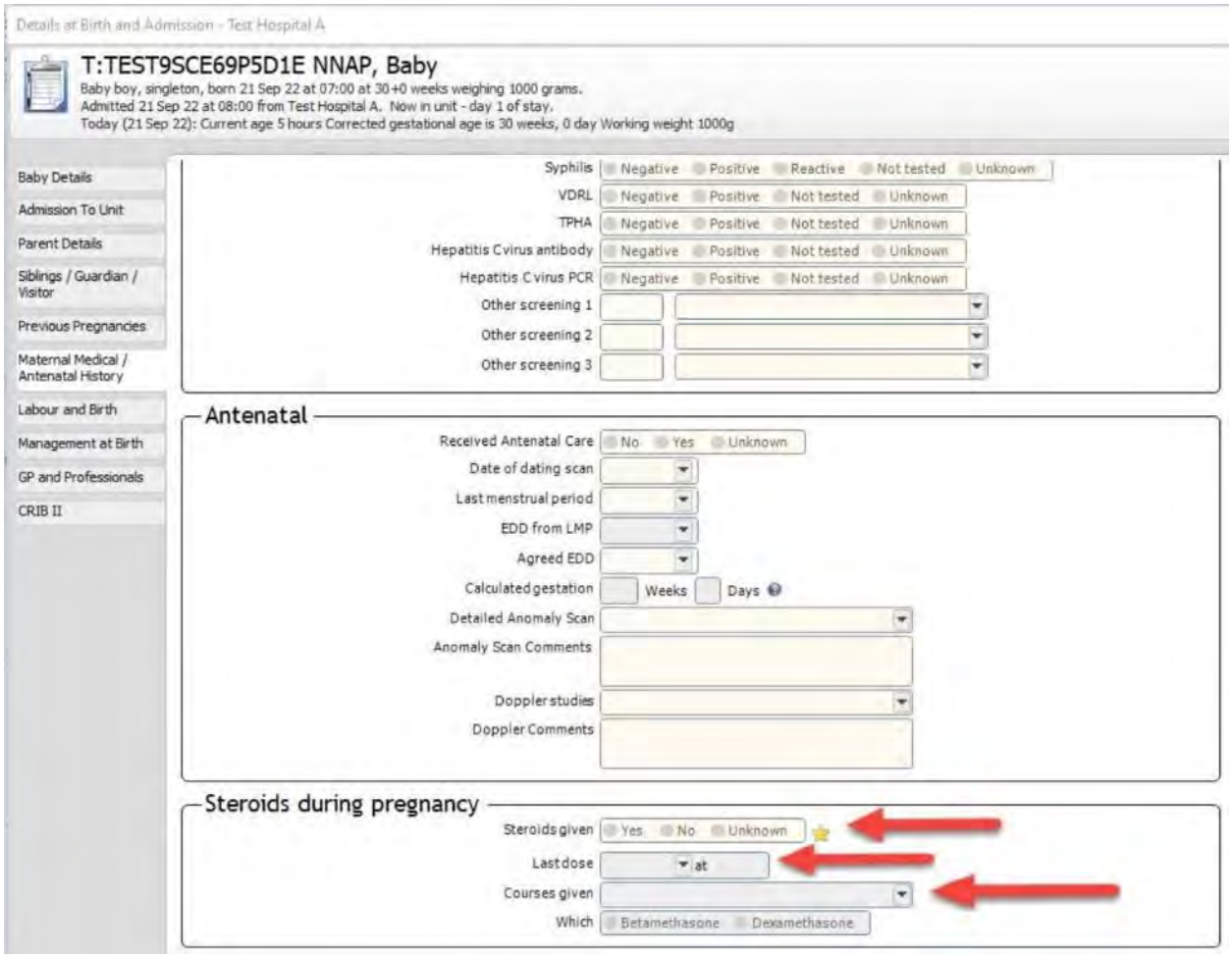


Figure 1: Pregnancy Details page, BadgerNet

2.2 Antenatal magnesium sulphate (component measure)

Does a mother who delivers a baby below 30 weeks' gestational age receive magnesium sulphate in the 24 hours prior to delivery?[1]

Change to the audit measure for 2023 data year: None. For 2022 reporting, the cohort was changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: Ninety percent (90%) of eligible mothers should receive antenatal magnesium sulphate.

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

Mothers of babies between 22 and 29 weeks gestational age. Only data from the first known episode of care will be considered for analysis. For multiple births, only one baby will be included so that each mother is only counted once per delivery.

Denominator: Number of mothers of babies between 22 and 29 weeks gestational age with complete magnesium sulphate data.

Numerator: Number of mothers of babies between 22 and 29 weeks gestational age who receive magnesium sulphate in the 24 hours prior to delivery.

Cohort: Babies who experienced their first admission in the calendar year of analysis.

Attribution

Results will be reported for each hospital of birth and network of birth.

When the place of birth is listed as *Home* or *Transit* the hospital and network will be assigned as the provider of their earliest episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

NNAP will use data from *Mother received magnesium sulphate in 24 hours prior to delivery* to categorise the administration of magnesium sulphate. When multiple births present different data, data will be taken from the baby with "the most positive"* for the audit.

Table 2: Categorising antenatal magnesium sulphate from BadgerNet field Mother received magnesium sulphate in 24 hours prior to delivery

Q1: Mother received $MgSO_4$ loading dose in 24 hours prior to delivery?	Q2: Was a minimum of 4 hours of antenatal $MgSO_4$ given after a loading dose and completed within 4 hours of the birth?		
	Yes	No	Unknown/Not recorded
Yes	Given	Given	Given
No	Given	Not given	Not given
Unknown / Not recorded	Given	Not given	Missing

**Most to least positive: magnesium sulphate given, magnesium sulphate not given, missing / unknown data.*

BadgerNet data source

Data from the *Labour and Delivery* page for *Mother received magnesium sulphate in 24 hours prior to delivery* will be used to determine if magnesium sulphate was given.

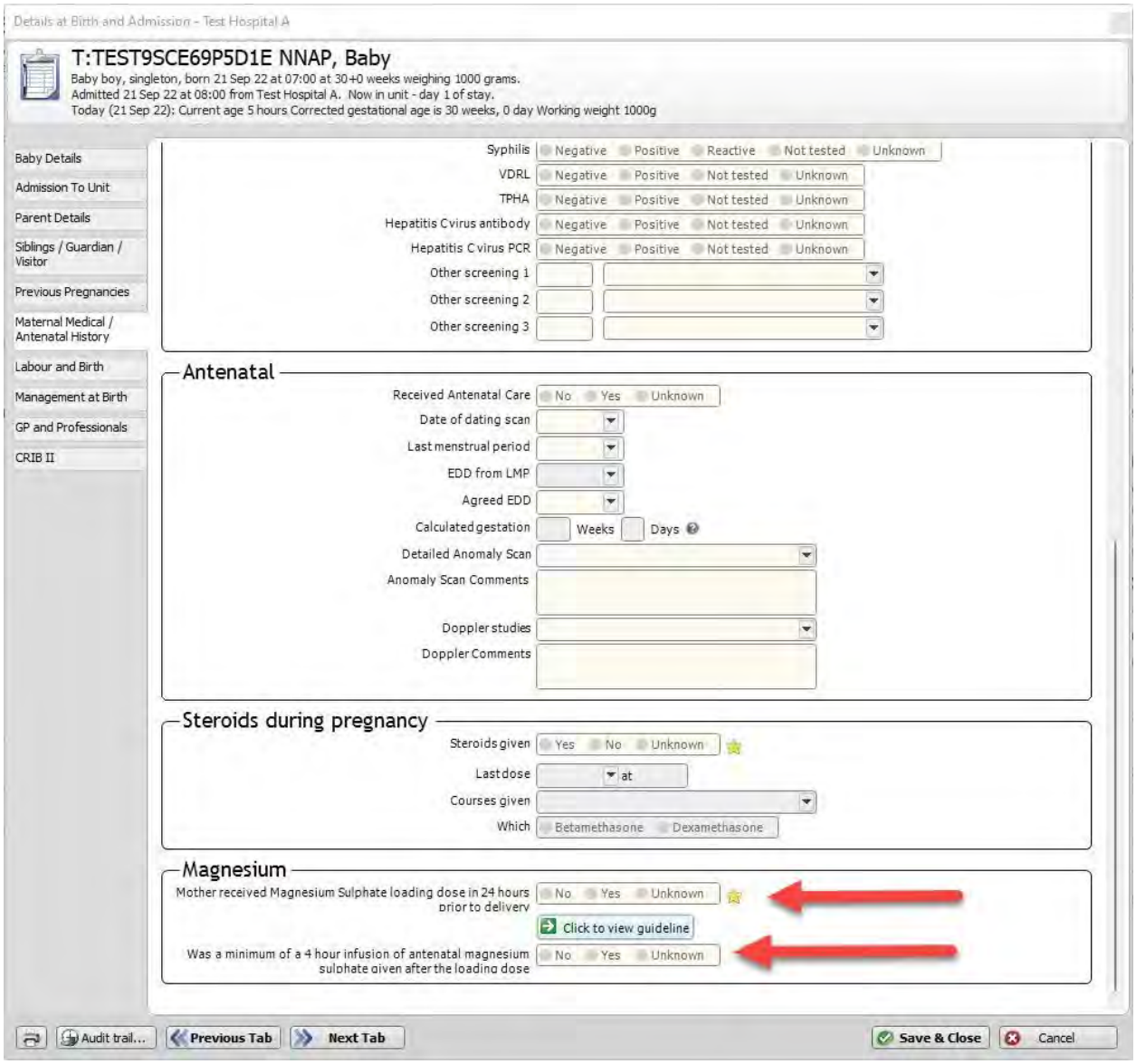


Figure 2: Labour and delivery page, BadgerNet

2.3 Birth in a centre with a neonatal intensive care unit (component measure)

Is a baby:

- *born at less than 27 weeks gestational age, or*
- *less than 800 grams at birth, or*
- *born as a multiple at less than 28 weeks gestational age*

delivered in a maternity service on the same site as a designated neonatal intensive care unit (NICU)?

Change to the audit measure for 2023 data year: None. For 2022 reporting this measure was amended to additionally include babies born at less than 800 grams, and babies born as a multiple at less than 28 weeks gestational age, in line with current guidance[2,3].

NNAP standard

Developmental standard: Eighty-five (85%) of babies born at less than 27 weeks gestational age should be delivered in a maternity service on the same site as a NICU.

Source of standard: Neonatal Critical Care Clinical Reference Group, NHS England.

Subject to outlier identification: Identification only at network level, no management process.

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

Mothers of babies between 22 and 26 weeks gestational age or at less than 800 grams at birth, or a multiple at between 22 and 27 weeks gestational age. Only data from the first known episode of care will be considered for analysis. For multiple births, only one baby will be included so that each mother is only counted once per delivery.

Denominator: Number of mothers of babies between 22 and 26 weeks gestational age or at less than 800 grams at birth, or a multiple at between 22 and 27 weeks gestational age.

Numerator: Number of mothers of babies between 22 and 26 weeks gestational age or at less than 800 grams at birth, or a multiple at between 22 and 27 weeks gestational age, who are delivered on a site with an NICU.

Cohort: Babies who experienced their first admission in the calendar year of analysis.

Attribution

Attribution will be to the neonatal network of birth. Outcomes will be reported by neonatal network of birth. Babies whose place of birth is listed as *Home or Transit* will have their network of birth updated to the provider network of their earliest episode.

Deriving outcomes

NNAP will use data from the place of birth to determine the level of neonatal unit within the hospital where babies were delivered (Table 2).

Table 2: Categorising birth in a centre with a NICU from BadgerNet field Place of birth

Place of birth	NNAP category
Hospital with a designated NICU	Delivered in appropriately designated location (NICU)
Hospital with a designated local neonatal unit (LNU) / special care unit (SCU)	Delivered in inappropriately designated location (LNU / SCU)
Hospital with no designated neonatal unit/ non-hospital location	Delivered in location without neonatal facilities

BadgerNet data source

Data on place of birth are captured on BadgerNet on the *Details at Birth and Admission* page. Values from the *Place of birth* field are used by NNAP for analysis (Figure 3).

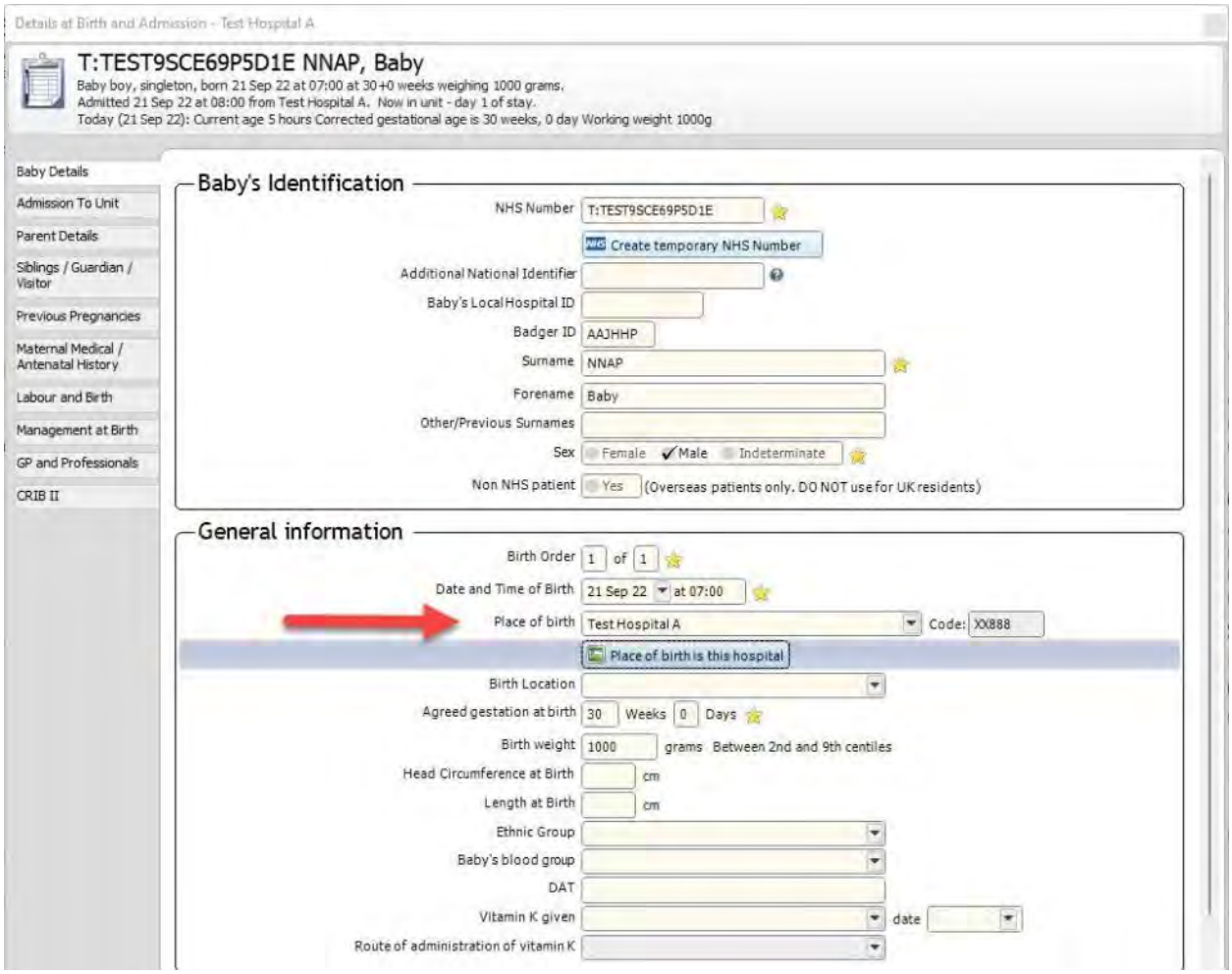


Figure 3: Details at birth and admission page, BadgerNet

2.4 Deferred cord clamping (component measure)

Does a baby born at less than 34 weeks' gestational age have their cord clamped at or after one minute?[1]

Change to the audit measure for 2023 data year: None. For 2022 reporting the upper gestational age cut off was changed from less than 32 weeks to less than 34 weeks, in line with MatNeoSIP measurement. The cohort was changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: Seventy-five percent (75%) of babies born at less than 34 weeks gestational age should have their cord clamped at or after one minute.

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

Babies born between 22 and 33 weeks gestational age. Only the first known episode of care will be considered for analysis.

Denominator: Number of babies born between 22 and 33 weeks gestational age with complete cord clamping data.

Numerator: Number of babies born between 22 and 33 weeks gestational age who had their cord clamped at or after 1 minute.

Cohort: Babies who experienced their first admission in the calendar year of analysis.

Attribution

Results will be reported for each hospital of birth and network of birth.

When the place of birth is listed as *Home* or *Transit* the hospital and network will be assigned as the provider of their earliest episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

NNAP will use data from the *Time of Cord Clamping* to determine whether cord clamping was deferred for 1 minute or more (Table 3).

Table 3: Categorising time of cord clamping in the NNAP

Time of cord clamping*				
Missing	**< 0 minutes**	**Less than a minute after birth**	**1 – 2 minutes after birth**	**More than 2 minutes after birth**
Time of cord clamping missing	Time of cord clamping missing	Less than 1 minute after birth	Deferred cord clamping (≥ 1 minute)	Deferred cord clamping (≥ 1 minute)

*Time of cord clamping is calculated by combining the *time of cord clamp minutes* and *time of cord clamp seconds* fields. If one of the two fields is not recorded, the not recorded field will be counted as 0, if both fields are not recorded, time of cord clamping will be counted as *missing*.

BadgerNet data source

Data on time of cord clamping are taken from the field *Time from birth to clamp* on the *Labour and Birth* page.

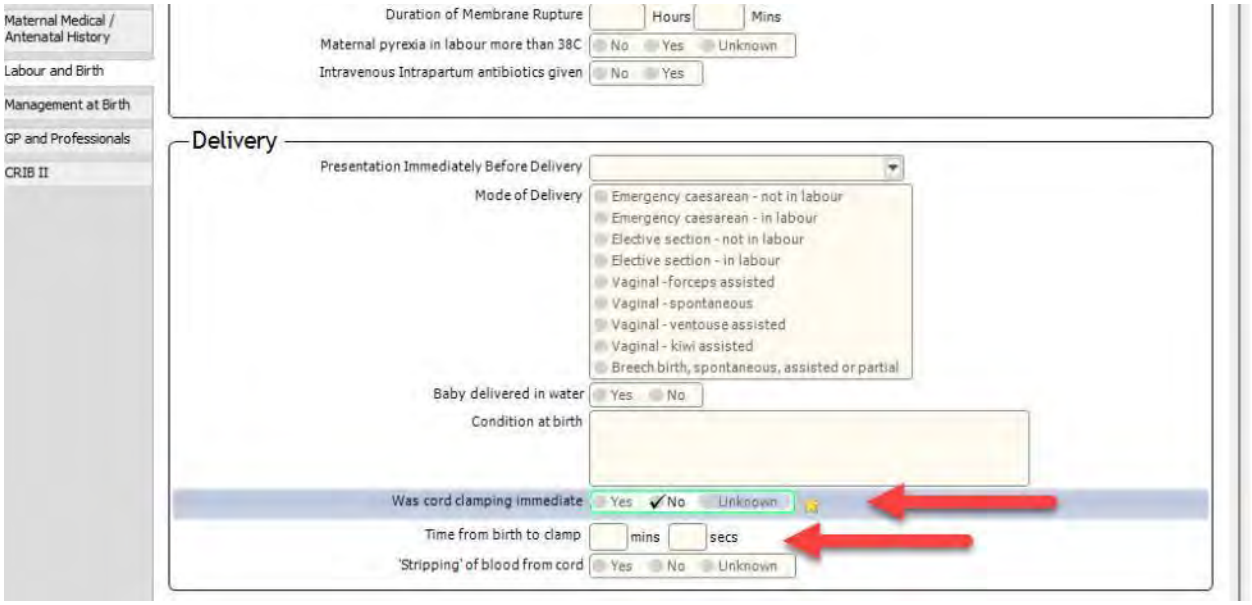


Figure 4: Delivery section, Labour and birth page, BadgerNet

2.5 Promoting normal temperature on admission (component measure)

Does a baby born at less than 34 weeks' gestational age have a first temperature on admission which is both between 36.5–37.5°C and measured within one hour of birth?[3,4]

Change to the audit measure for 2023 data year: The upper gestational age cut-off has been increased from 32 weeks to 34 weeks, in line with MatNeoSIP measurement. For 2022 reporting, the cohort was changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: First temperature on admission should be taken within an hour of birth for all eligible babies.

The composite measure of timeliness and normal temperature should be met for at least ninety percent (90%) of babies.

Source of standard: NNAP Project Board

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

Babies born between 22 and 33 weeks gestational age and admitted to a neonatal unit within an hour of birth. Only the first known episode of care will be considered for analysis.

Denominator: Number of babies born between 22 and 33 weeks gestational age with complete temperature data.

Numerator: Number of babies born between 22 and 33 weeks gestational age who have a first temperature on admission which is both between 36.5 37.5°C and measured within one hour of birth.

Cohort: Babies who experienced their first admission in the calendar year of analysis.

Attribution

Results will be reported for each hospital of birth and network of birth.

When the place of birth is listed as *Home* or *Transit* the hospital and network will be assigned as the provider of their earliest episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

NNAP will use data from the first temperature taken after admission to categorise when babies had their temperature taken, and the value of temperature measurement (Table 4).

Table 4: Categorising temperature measurement from BadgerNet fields Temperature measured after admission, Temperature value and Temperature not recordable

Time of first temperature measurement (minutes from birth)	Value of first temperature measurement				
	Temp. not taken	< 35.9°C	36-36.4°C	36.5-37.5°C	>37.5°C
Temperature not taken after admission	Not taken	Not taken	Not taken	Not taken	Not taken
Within an hour (≤ 60 minutes from birth)	Not taken	Within an hour	Within an hour	Within an hour and between 36.5-37.5	Within an hour and >37.5
After an hour (> 60 minutes from birth)	Not taken	Late	Late	Late	Late

Categorising temperature values

Babies with a temperature measured *Within an hour* will be further categorised into the following groups based on their temperature values:

- Less than 32.0°C
- 32.0°C-35.9°C
- 36.0°C-36.4°C
- 36.5°C-37.5°C (normothermic)
- Greater than 37.5 °C

When the temperature value was not recordable, babies will be assigned to the 32.0°C-35.9°C group.

BadgerNet data source

Details on temperature measurement are captured on BadgerNet on the *Details at Birth and Admission* page. Values from the *Temperature measured after admission*, *Temperature value* and *Temperature not recordable* fields are used by NNAP for analysis (Indicated below).

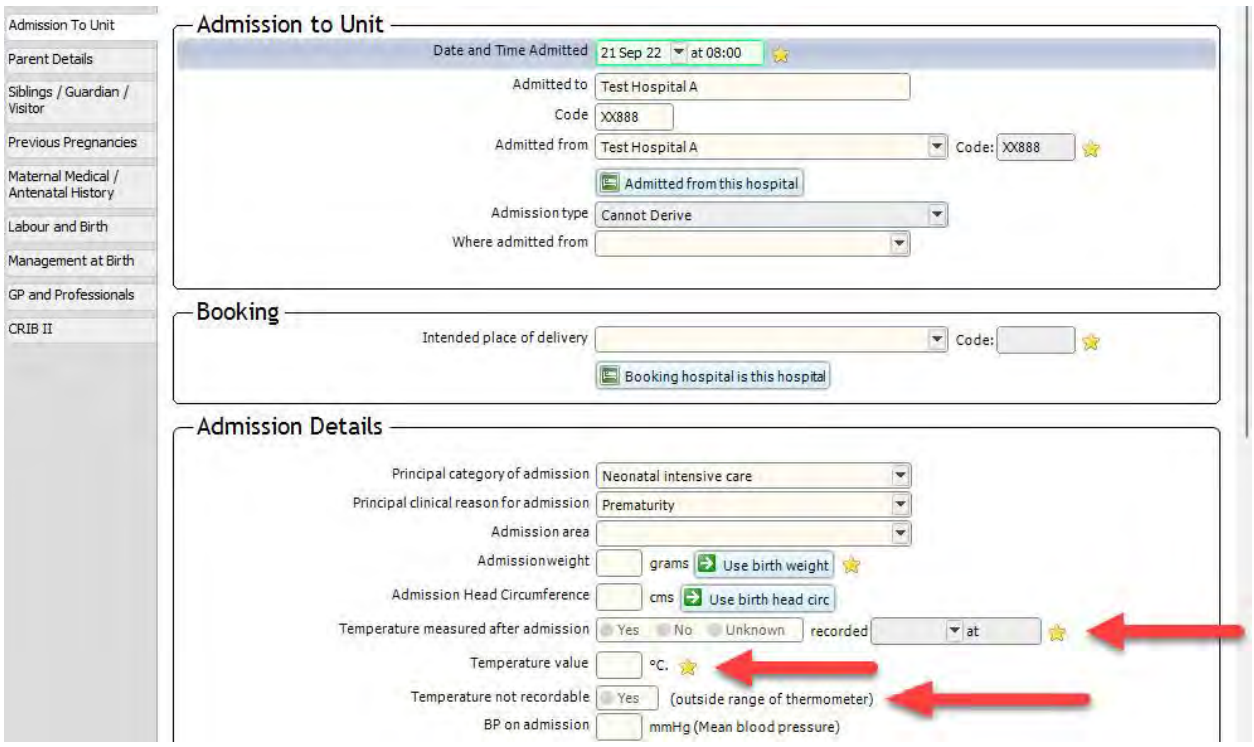


Figure 5: Details at birth and admission page, BadgerNet

2.6 Breastmilk feeding in the first 2 days of life (component measure)

Does a baby born at less than 34 weeks' gestational age receive any of their own mother's milk in the first 2 days of life?

Change to the audit measure for 2023 data year: None. New measure from 2022, introduced to align with MatNeoSIP measurement.

NNAP standard

Developmental standard: Sixty percent (60%) of babies born at less than 34 weeks should receive any of their own mother's milk in the first 2 days of life.

Subject to outlier identification: Identification only, no management process.

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

Babies born between 22 and 33 weeks gestational age who survive to 48 hours on a neonatal unit.

Denominator: Number of babies born between 22 and 33 weeks gestational age who survive to 48 hours on a neonatal unit and have complete feeding data for either of their first two days of life.

Numerator: Number of babies born between 22 and 33 weeks gestational age who receive any of their own mother's milk in the first two days of life.

Cohort: Babies who experienced their first admission in the calendar year of analysis.*

**Note that the cohort of babies included in this measure is different to measures 4.2 and 4.3, which consider babies discharged in the calendar year of analysis.*

Attribution

- Babies will be attributed to their hospital and network of first admission.

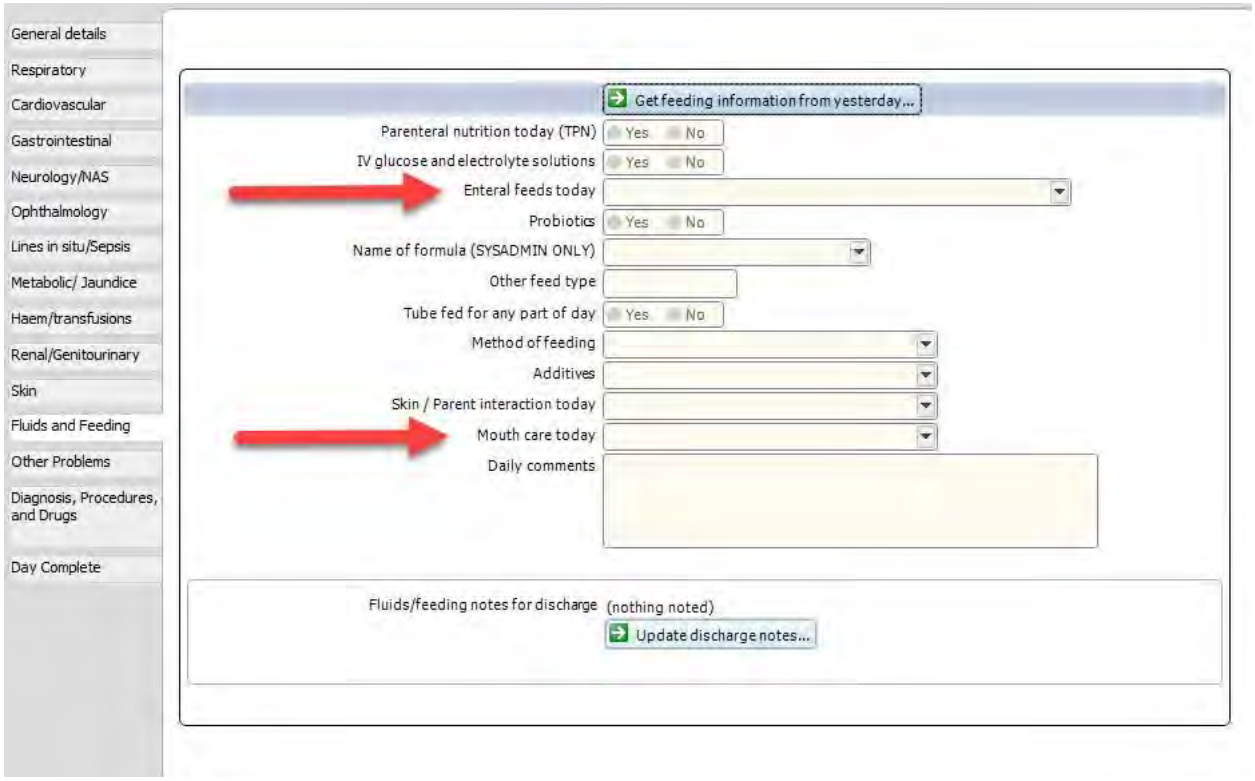
Deriving outcomes

Babies will be classified as meeting the NNAP standard if they are noted to have received any of the following types of enteral feed or mouth care on the day of birth or day after birth.

- Suckling at the breast
- Mother's fresh expressed breastmilk
- Mother's frozen expressed breastmilk
- Breastmilk (mouth care)
- Colostrum (mouth care)

BadgerNet data source

The primary source for information on feeding at discharge is daily summary data on enteral feeds for the day of birth or day after birth on the BadgerNet system.


General details
Respiratory
Cardiovascular
Gastrointestinal
Neurology/NAS
Ophthalmology
Lines in situ/Sepsis
Metabolic/ Jaundice
Haem/transfusions
Renal/Genitourinary
Skin
Fluids and Feeding
Other Problems
Diagnosis, Procedures, and Drugs
Day Complete
Get feeding information from yesterday...
Parenteral nutrition today (TPN)
Yes
No
IV glucose and electrolyte solutions
Yes
No
Enteral feeds today
Probiotics
Yes
No
Name of formula (SYSADMIN ONLY)
Other feed type
Tube fed for any part of day
Yes
No
Method of feeding
Additives
Skin / Parent interaction today
Mouth care today
Daily comments
Fluids/feeding notes for discharge
(nothing noted)
Update discharge notes...

3 Clinical outcomes composite metric

Proportion of babies born between 24 and 31 weeks gestation inclusive who did not have a reported serious complication of prematurity (late onset infection, NEC, BPD, serious preterm brain injury or mortality).

Change to the audit measure for the 2023 data year: New measure derived from existing individual measures already reported by the NNAP. No additional data collection.

Please note that this measure definition is provisional and subject to change.

NNAP standard

Developmental standard: None, initially benchmarking only for the new measure.

Subject to outlier identification: No.

Inclusion criteria

Babies admitted to a neonatal unit whose birth gestation is between 24 and 31 weeks inclusive. For multiple births, each baby will be included.

Denominator: Number of babies admitted to a neonatal unit whose birth gestation is between 24 and 31 weeks inclusive, and who are not classified as *missing*.

Numerator: Number of babies admitted to a neonatal unit whose birth gestation is between 24 and 31 weeks inclusive and who do not experience any of the adverse outcomes from the component measures for which they are eligible. Babies will be assessed against each of the measures for which they are eligible, this means that some babies will not be measured against all 6 measures.

Cohort: Babies who turned 44 weeks PMA within the reporting period.

Attribution

Results will be reported for each hospital of birth and network of birth.

When the place of birth is listed as *Home* or *Transit* the hospital and network will be assigned as the provider of their earliest episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

As this is a composite measure, babies will be measured against each of the following 6 measures for which they are eligible*:

- Bronchopulmonary dysplasia
- Necrotising enterocolitis
- Bloodstream infection
- Mortality
- Serious brain injury – IVH 3/4
- Serious brain injury – cPVL

As there is variation in the inclusion criteria for these measures, not all babies are eligible for all 6 of them. Babies will only be measured against measures for which they are eligible.

Babies will be counted as having an *adverse outcome* if they have an adverse outcome for **any** of the measures for which they are eligible.

Babies will be counted as having *no adverse outcome* if they have no adverse outcome for **all** of the measures for which they are eligible.

Babies will be counted as *missing* if they have a *missing* status for **any** of the measures for which they are eligible **and** no adverse outcomes for the other measures for which they are eligible.

**Examples of ineligibility include babies first admitted to an NNAP NNU after 48 (NEC measure) or 72 (BSI measure) hours of life.*

3.1 Bloodstream infection (component measure)

Does an admitted baby born at less than 32 weeks have one or more episodes of bloodstream infection, characterised by one or more positive blood cultures taken with a clearly pathogenic organism, after 72 hours of age?

Change to the audit measure for 2023 data year: None.

NNAP standard

Developmental standard: Benchmarking only.

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: Treatment effect of 0%.

Inclusion criteria

Babies between 22 and 31 weeks gestational age who were present on a neonatal unit at 72 hours of age.

Denominator: Number of babies between 22 and 31 weeks gestational age who were present on a neonatal unit at 72 hours of age.

Numerator: Number of babies between 22 and 31 weeks gestational age who were present on a neonatal unit at 72 hours of age who had one more positive blood cultures with a clearly pathogenic organism taken after 72 hours of age.

Cohort: Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

Blood cultures will be attributed to the neonatal unit of care when the culture was taken, or for units where there were two such units on a day of care, the unit completing the culture form. Babies will be counted as eligible once in each neonatal unit they were admitted to.

Deriving outcomes

Culture records will be considered as complete if the pathogen results for the culture are entered including 'None' or 'No growth'.

Growths of bacteria, yeasts or fungi will be classified as per Table 5. A reference list of clearly pathogenic organisms will be used (see Appendix 1 of this measures guide).

Table 5: Classification of organisms grown in blood cultures - late onset bloodstream infection

Pathogens classification	Fungal and bacterial culture growths	Organisms of uncertain significance
Pure growths	Pathogenic	Not clearly pathogenic
Mixed growths	Not clearly pathogenic	Not clearly pathogenic

Data pertaining to late onset bloodstream infection will be subdivided by "any positive culture" and "clearly pathogenic organism". Data viewing will be further enhanced by

presentation of an indication that all positive blood cultures have been entered, for centres where this is the case.

BadgerNet data source

Details for blood cultures and their results will be captured via ad-hoc forms for cultures on BadgerNet.

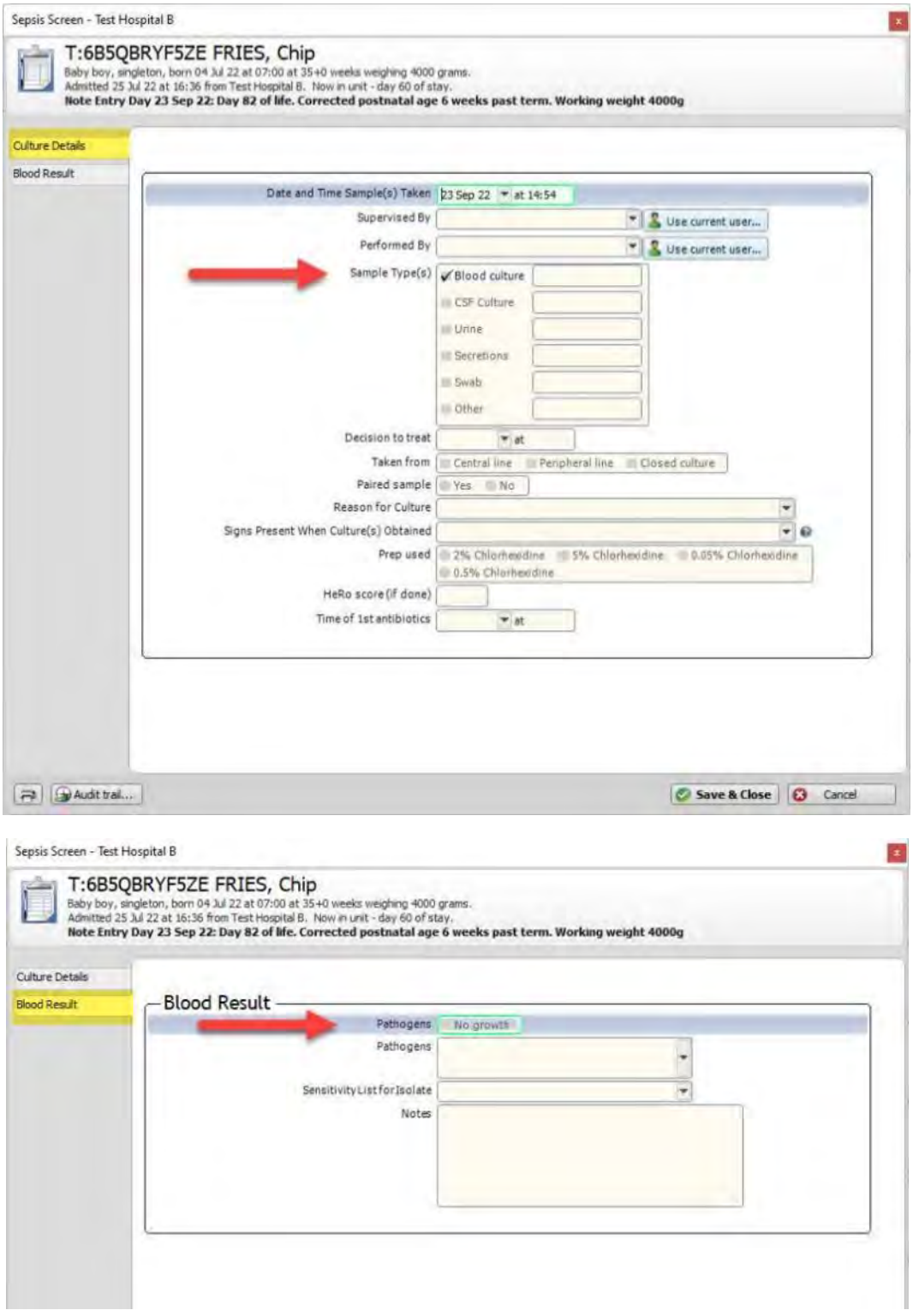


Figure 6: Ad-hoc form for blood culture taken (top), and ad-hoc form for blood culture results (bottom)

3.2 Bronchopulmonary dysplasia (component measure)

Does an admitted baby born at less than 32 weeks' gestational age develop bronchopulmonary dysplasia (BPD) or die?

Change to the audit measure for 2023 data year: In 2023, the cohort changed from babies discharged within the calendar year of analysis to babies who turned 44 weeks PMA in the calendar year of analysis. From 2023, the NNAP will report BPD on 1-year epochs. Previously the NNAP reported three-year rolling epochs.

NNAP standard

Developmental standard: None, benchmarking only.

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: Treatment effect of 0%.

Inclusion criteria

Babies born between 22 and 31 weeks gestational age who were still an inpatient in a neonatal unit at 36 weeks' postmenstrual age, had been discharged alive from neonatal care at less than 36 weeks' postmenstrual age, or had died before 36 weeks postmenstrual age.

Denominator: Number of babies born between 22 and 31 weeks gestational age who were still an inpatient in a neonatal unit at 36 weeks' postmenstrual age, had been discharged alive from neonatal care at less than 36 weeks' postmenstrual age, or had died before 36 weeks postmenstrual age, and who have complete respiratory data at 36 weeks of life.

Numerator: Number of babies born between 22 and 31 weeks gestational age, who developed BPD or died.

Cohort: Babies who turned 44 weeks PMA in the calendar year of analysis.

Attribution

Attribution will be to the hospital of birth. Outcomes will also be reported by network of birth.

When the place of birth is *Home* or *Transit* the hospital will be assigned as *Other* and the network will be assigned as the network associated with the first episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

BPD will be defined by the level of respiratory support received at 36 weeks' post-menstrual age (Table 6).

When a baby was discharged from neonatal care before reaching 36 weeks' post-menstrual age, data from the time of discharge will be used instead.

Table 6: Categorising BPD or death in NNAP based on daily respiratory support data

Survival at 36 weeks CGA	Respiratory data from 36 weeks post-menstrual age / final discharge		
	Not receiving respiratory support	Receiving respiratory support*	Missing required respiratory data**
Died before 36 weeks PMA	Died	Died	Died
Survived to 36 weeks PMA	No BPD	BPD	BPD not determinable

*'*Respiratory Support' is defined as receiving any of the following at the specified time:*

- *Ventilation*
- *CPAP*
- *Non-invasive ventilation (e.g. BiPAP)*
- *Hi flow nasal cannula therapy (i.e. ≥ 2 lpm gas flow)*
- *Oxygen treatment*

*** In instances where respiratory data is not available for the specified day, data from the subsequent day of care (or penultimate day of care for babies discharged at less than 36 weeks) will be sought instead. When respiratory data is also missing from this second source the baby will be classified as 'Missing required data' for that period.*

Babies will be defined as having missing data if there is no data available to determine respiratory support.

BadgerNet data source

Details on respiratory support used to calculate levels of BPD are captured on BadgerNet in daily summary forms. A form is created for each baby for each calendar day where they are an inpatient on a neonatal unit, and the fields *Respiratory Support*, *Added oxygen*, *Mode of ventilation* and *Mode of non-invasive support* will be used by the NNAP.

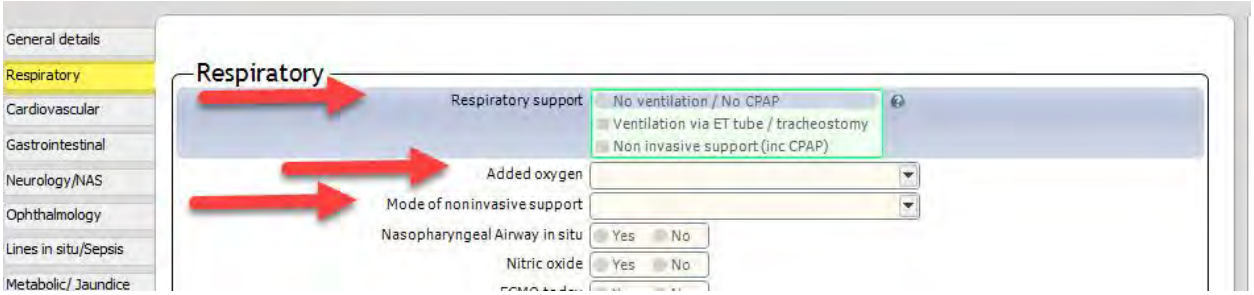


Figure 7: Daily summary form, BadgerNet

3.3 Necrotising enterocolitis (component measure)

Does an admitted baby born at less than 32 weeks' gestational age meet the NNAP surveillance definition for necrotising enterocolitis (NEC) on one or more occasion?

Change to the audit measure for 2023 data year: From 2022 onwards, "NEC status missing" takes priority over "No NEC" for determining final outcome.

NNAP standard

Developmental standard: Benchmarking

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: Treatment effect of 0%.

Inclusion criteria

Babies born between 22 and 31 weeks gestational age who survived to 48 hours after birth.

Denominator: Number of babies born between 22 and 31 weeks gestational age who survived to 48 hours after birth and who have a complete NEC diagnosis field.

Numerator: Number of babies born between 22 and 31 weeks gestational age who survived to 48 hours after birth and who meet the NNAP surveillance definition for necrotising enterocolitis on one or more occasion.

Cohort: Babies discharged in the calendar year of analysis.

Attribution

- Babies will be attributed to their location of care at 48 hours of life, which is intended as a proxy measure of the intention to provide ongoing care for a baby in a given neonatal unit.
- When a baby is in transit between units at 48 hours of life the baby will be assigned to the transferring hospital. When multiple admission locations exist at 48 hours of life, the baby will be attributed to the earliest associated admission time.

Deriving outcomes

The outcome is based on an analysis of all episodes for each eligible baby, using the following order of priority for the final outcome: Confirmed NEC > NEC status missing > No NEC.

NEC may be diagnosed at surgery, post-mortem or based on the following clinical and radiographic signs.

At least one clinical feature from:

- Bilious gastric aspirate or emesis
- Abdominal distension
- Occult or gross blood in stool (no fissure)

And at least one radiographic feature from:

- Pneumatosis
- Hepato-biliary gas
- Pneumoperitoneum

Infants clinically diagnosed as NEC using the clinical and radiographic criteria who are found at surgery or post-mortem to have "Focal Intestinal Perforation" should not be recorded as having NEC.

Table 7: Categorisation of NEC diagnosis

Survival to discharge home	Was NEC Diagnosed during this admission?					
	NEC diagnosis based on surgery	NEC diagnosis based on post-mortem	NEC diagnosis based on presence of clinical signs		NEC not diagnosed	NEC diagnosis data not recorded
			At least 1 radiographic and 1 clinical feature	Radiographic or clinical features missing		
Survived to discharge home	NEC	NEC	NEC	No NEC (NEC undiagnosed)	No NEC	Missing data
Died prior to discharge home	NEC	NEC	NEC	No NEC (NEC undiagnosed)	No NEC but died prior to discharge	Missing data

BadgerNet data source

For babies born at less than 32 weeks', the field *Was NEC diagnosed during this admission?* will appear on the *Discharge details* data from this field, and its follow on question (*Based on*, *Clinical feature(s)*, *Radiographic Features.*

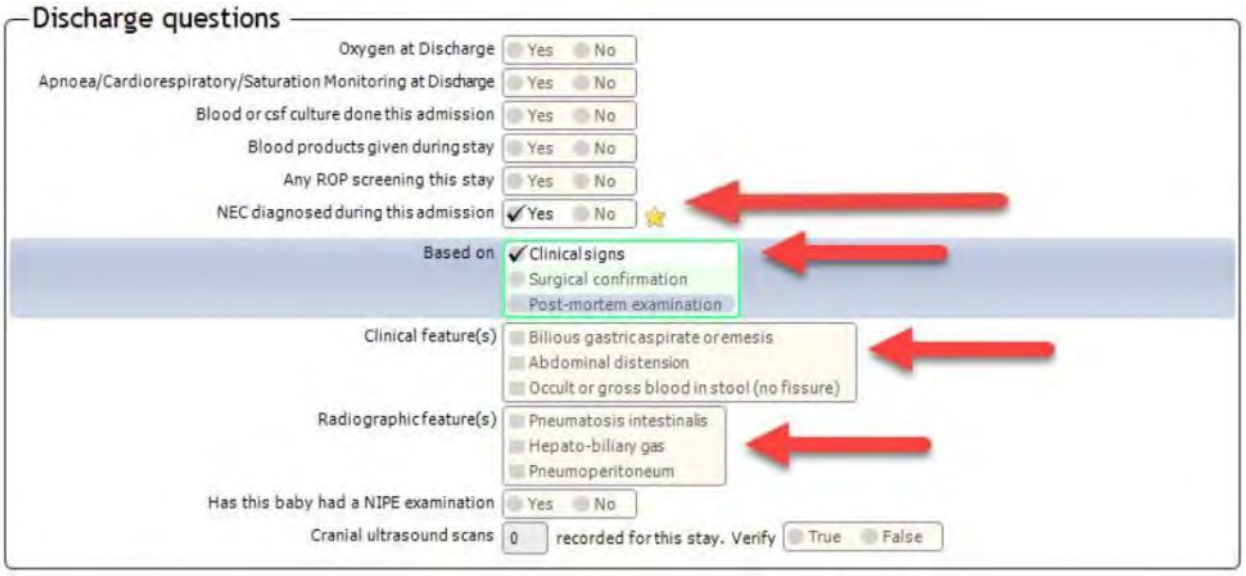


Figure 8: Discharge details page, BadgerNet

3.4 Preterm brain injury – IVH 3 or 4 (component measure)

Does a baby born at less than 32 weeks' gestational age experience any *intraventricular haemorrhage (IVH) grade 3 or 4?*

Change to the audit measures for 2023 data year: In 2023, the cohort changed from babies discharged within the calendar year of analysis to babies who turned 44 weeks PMA in the calendar year of analysis.

NNAP standard

Developmental standard: None, benchmarking only.

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: Based on rates of missing data, outlier thresholds TBC.

Inclusion criteria

Babies born between 22 and 31 weeks gestational age.

Denominator: Number of babies born between 22 and 31 weeks gestational age with a complete scan in the first 28 days of life.

Numerator: Number of babies born between 22 and 31 weeks gestational age who experience IVH 3/4 or die before discharge.

Cohort: Babies who turned 44 weeks PMA in the calendar year of analysis.

Attribution

Outcomes will be attributed to the unit and network of birth.

When the place of birth is *Home* or *Transit* the hospital will be assigned as *Other* and the network will be assigned as the network associated with the first episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

The analysis will be based on cranial ultrasound imaging data. Where no imaging is recorded for a baby, this will be reported as "no imaging".

Where babies have scans on the system, but the scans contain no relevant data, they will be listed as Missing Data.

The outcomes will be reported according to the following definition, which are also visible in the Badger system:

Germinal Matrix/ Intraventricular Haemorrhage and Haemorrhagic Parenchymal Infarction

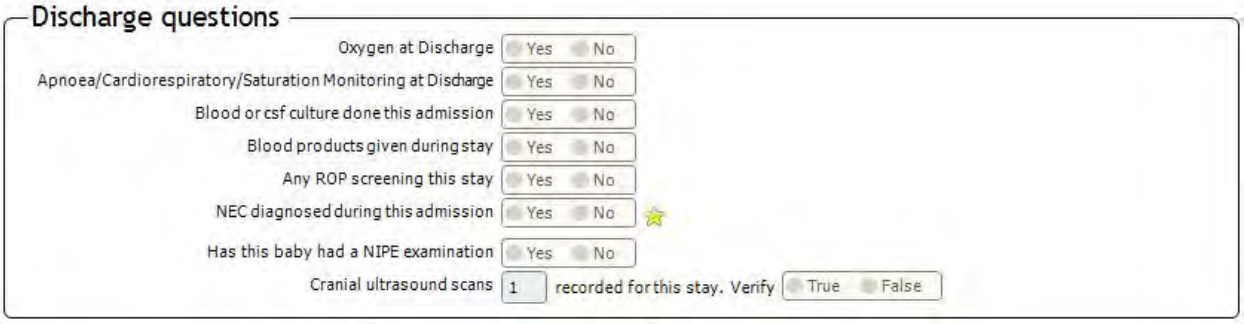
Recording the worst grade of GMH-IVH interpreted by any cranial ultrasound or MRI, performed on or before day 28 after birth; or clarify that no imaging was performed in the first 28 days.

Grading is based on an ultrasound classification system and is recorded separately per side (i.e. left and/or right):[5]

- No germinal matrix or intraventricular haemorrhage
- Grade 1: Germinal matrix haemorrhage with no or minimal intraventricular haemorrhage (<10% of ventricular area on parasagittal view)
- Grade 2: Intraventricular haemorrhage (10-50% of ventricular area on parasagittal view)
- Grade 3: Intraventricular haemorrhage (>50% of ventricular area on parasagittal view; usually distends lateral ventricle).
- Grade 4: Haemorrhagic infarction in periventricular white matter (with or without IVH)

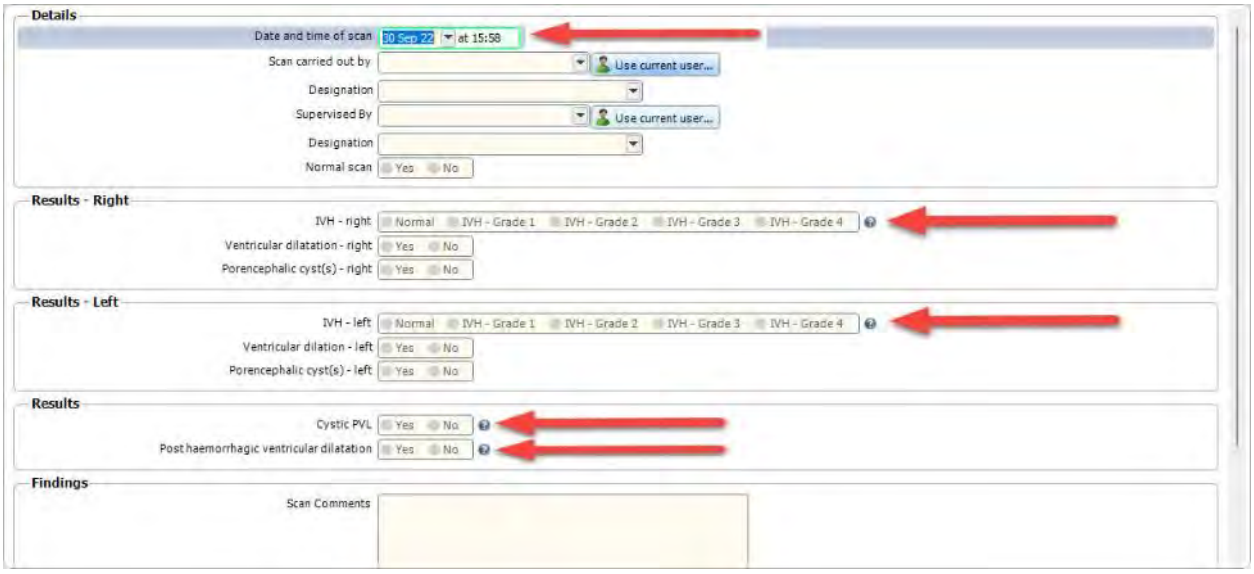
BadgerNet Data Source

In the discharge details section of BadgerNet, professionals discharging a baby are asked to complete the following:



Clinical staff are asked to ensure the number of scans entered, and the scan data recorded adequately describes the full extent of scan findings, according to the classification system described above, for eligible babies. The verification of the number of scans is designed to act as a prompt to clinical staff at discharge, to ensure this data entry is adequate.

The scan should be recorded using the cranial ultrasound section of the “Procedures/ events tab”. Findings from the examination should be recorded as below:



Important note: Entering cranial ultrasound scans on BadgerNet

We are aware of an issue with BadgerNet which means that you can't add a cranial ultrasound scan record via the Procedures/events tab in the BadgerNet client if a baby cared for in your unit went on to have a subsequent episode in another unit. Clevermed are aware of this and are working on a fix, however in the meantime you can use the "smart search" function and search for "cranial" to add a new note to the desired episode of care. If you have any questions about how to do this, please do get in touch with Clevermed directly.

Please also note that details entered into BadgerNet EPR's Detailed Cranial Ultrasound form are not currently included in the analysis.

3.5 Preterm brain injury – cPVL (component measure)

Does a baby born at less than 32 weeks' gestational age experience cystic periventricular leukomalacia (cPVL)?

Change to the audit measures for 2023 data year: In 2023, the cohort changed from babies discharged within the calendar year of analysis to babies who turned 44 weeks PMA in the calendar year of analysis.

NNAP standard

Developmental standard: None, benchmarking only.

Subject to outlier identification: No.

Inclusion criteria

Babies born between 22 and 31 weeks gestational age.

Denominator: Number of babies born between 22 and 31 weeks gestational age with a complete scan.

Numerator: Number of babies born between 22 and 31 weeks gestational age who experience cPVL or die before discharge.

Cohort: Babies who turned 44 weeks PMA in the calendar year of analysis.

Attribution

Outcomes will be attributed to the unit and network of birth.

When the place of birth is *Home* or *Transit* the hospital will be assigned as *Other* and the network will be assigned as the network associated with the first episode. When the place of birth is the site of a closed unit the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

The analysis will be based on cranial ultrasound imaging data. Where no imaging is recorded for a baby, this will be reported as "no imaging".

Where babies have scans on the system, but the scan contains no relevant data, they will be listed as Missing Data.

The outcomes will be reported according to the following definition, which is also visible in the Badger system:

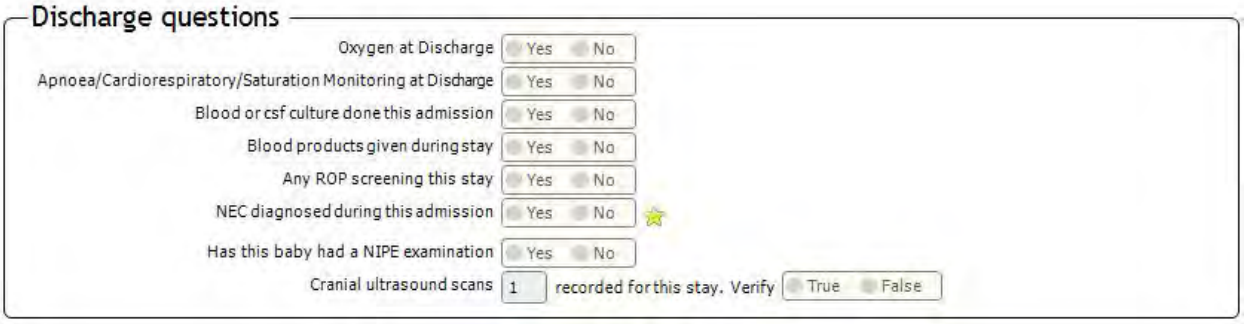
Cystic Periventricular Leukomalacia

At any time during the infant's stay:

- Evidence of cystic periventricular leukomalacia on a cranial ultrasound or MRI scan obtained at any time during admission or clarify that NO imaging was performed during the admission.
- To be considered cystic periventricular leukomalacia there must be multiple small periventricular cysts identified in the white matter.
- Connatal cysts should not be included. Connatal cysts are thin walled cysts in the lateral aspect of frontal horn of lateral ventricle and anterior to the foramen of Monro.

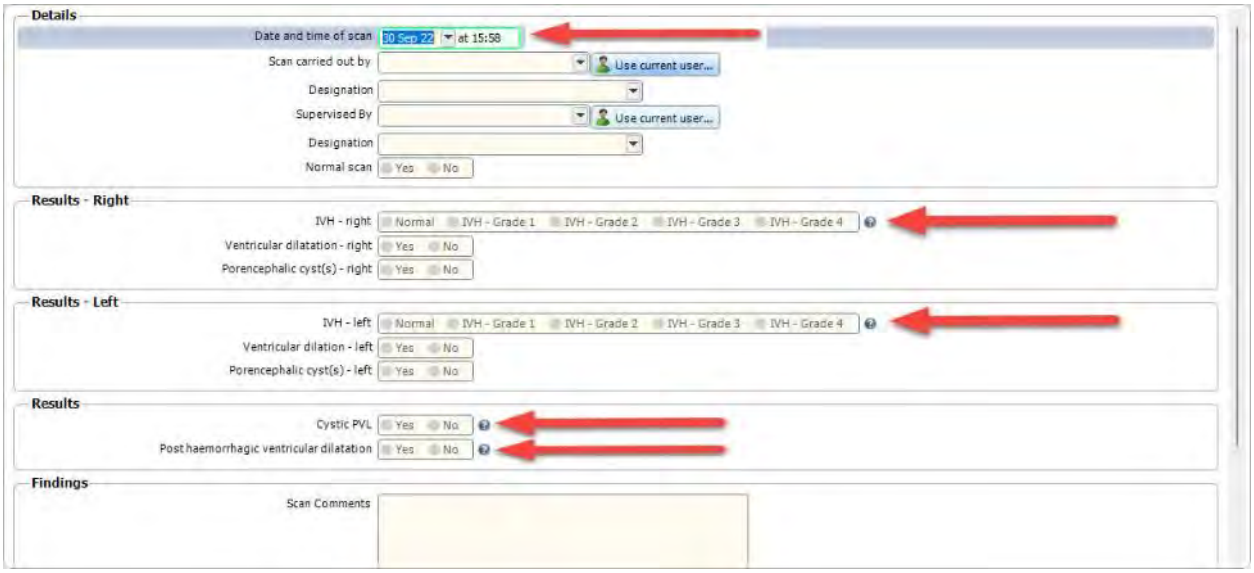
BadgerNet data source

In the discharge details section of BadgerNet, professionals discharging a baby are asked to complete the following:



Clinical staff are asked to ensure the scan data recorded adequately describes the scan findings, according to the classification system described above, for eligible babies.

The scan should be recorded using the cranial ultrasound section of the "Procedures/ events tab". Findings from the examination should be recorded as below:



Important note: Entering cranial ultrasound scans on BadgerNet

We are aware of an issue with BadgerNet which means that you can't add a cranial ultrasound scan record via the Procedures/events tab in the BadgerNet client if a baby cared for in your unit went on to have a subsequent episode in another unit. Clevermed are aware of this and are working on a fix, however in the meantime you can use the "smart search" function and search for "cranial" to add a new note to the desired episode of care. If you have any questions about how to do this, please do get in touch with Clevermed directly.

Please also note that details entered into BadgerNet EPR's Detailed Cranial Ultrasound form are not currently included in the analysis.

Important note: Post-haemorrhagic ventricular dilatation

The NNAP does not currently produce any public reporting on PHVD and it is not included as a component measure in the clinical outcomes composite metric. However, the NNAP still collects data on this condition and will continue to report missing data on it.

PHVD is calculated identically to cPVL, except that it reports on the PHVD section of the cranial ultrasound, as opposed to the cPVL section. PHVD is classified as:

On any ultrasound or MR imaging, performed at any time during the stay, was the following diagnosed:

- Intraventricular haemorrhage (past or residual) with enlarged ventricles: VI >97th centile.

4 Parental consultation within 24 hours of every admission

Is there a documented consultation with parents by a senior member of the neonatal team, within 24 hours of admission?* [6,7,8]

**By senior member of the neonatal team, NNAP means a consultant or middle grade doctor, or a nurse practitioner acting in such a role.*

Change to the audit measure for 2023 data year: None. For 2022 reporting, the cohort was changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: A consultation should take place within 24 hours of admission for every admission (100%).

Source of standard: NNAP Project Board

Subject to outlier identification: No.

Inclusion criteria

Admissions to neonatal units lasting at least 12 hours and receiving special care or a higher order of neonatal care. Babies receiving neonatal care in non-neonatal unit locations (postnatal ward, transitional care etc.) will not be included. Babies admitted to a neonatal unit, or units, more than once will count as having had more than one admission.

Denominator: Number of admissions to neonatal units lasting at least 12 hours and receiving special care or a higher order of neonatal care, with complete consultation data.

Numerator: Number of admissions to neonatal units lasting at least 12 hours and receiving special care or a higher order of neonatal care with a documented consultation with parents by a senior member of the neonatal team within 24 hours of admission. Presented as a proportion.

Cohort: Admissions in the calendar year of analysis.

Attribution

Results will be attributed to the neonatal unit and network of admission.

Deriving outcomes

The recorded time for first consultation with a senior member of staff is compared to the time of admission to determine when consultation takes place. The NNAP standard is aimed specifically at consultation at or after the time of admission, and so consultations prior to admission or birth cannot meet the NNAP standard (Table 8).

Table 8: Categorising consultation with parents from BadgerNet fields Parents seen by senior staff and Time first seen

Time of first consultation	NNAP category
Before admission	Before admission
Time of admission – 24 hours after admission	Within 24 hours (NNAP standard)
More than 24 hours after admission	After 24 hours
Confirmed "no consultation"	No consultation
Confirmed "unknown"	Missing
Consultation time not recorded	Missing

BadgerNet data source

Details on first consultation are captured on BadgerNet on the *Details at Birth and Admission* page. The answer to the question *Parents seen by senior staff* and the *Time first seen* are used by NNAP for analysis.

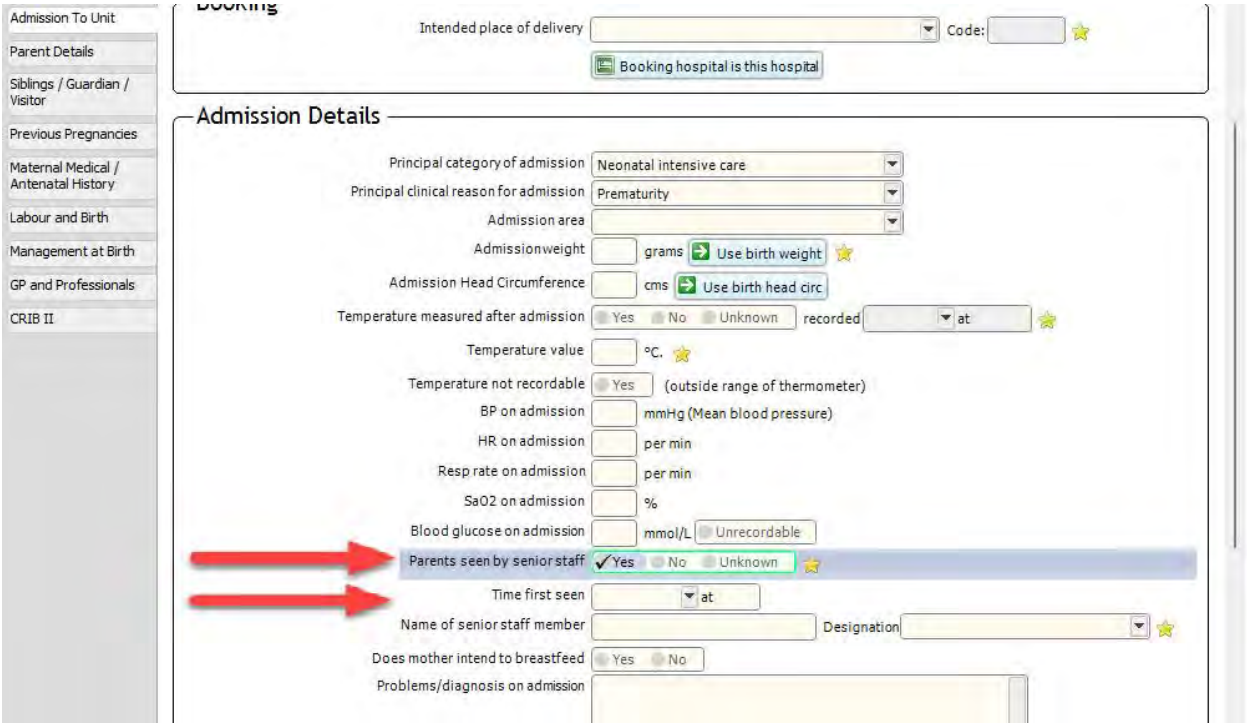


Figure 9: Details at birth and admission page, BadgerNet

5 Parental inclusion in consultant ward rounds

What proportion of baby care days had a consultant-led ward round with at least one parent included?

**Consultant ward round refers to any ward round where a consultant is in attendance, at any time of the day.*

Change to the audit measure for 2023 data year: The first part of the measure has been removed and there is now only one part to the measure: "What proportion of baby care days had a consultant-led ward round with at least one parent included?".

The denominator for this measure has been expanded to include days on which a consultant ward round did not occur.

NNAP standard

Developmental standard: Benchmarking only.

Subject to outlier identification: No.

Inclusion criteria

Care days from all admissions to neonatal units that are at least one full calendar day in length (midnight to midnight). All full calendar days from each eligible admission for a baby will be included. Ward days on non-neonatal unit locations (postnatal ward, transitional care etc.) will not be included.

Denominator: Number of care days from all admissions to neonatal units that are at least one full calendar day in length (midnight to midnight) and have complete consultation data.

Numerator: Number of care days from all admissions to neonatal units that are at least 24 hours in length with at least one parent present on the consultant ward round. Presented as a proportion.

Cohort: Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

Attribution will be to the neonatal unit providing care in each eligible admission.

Deriving outcomes

NNAP will use data captured as part of the daily summary of care to confirm parental presence on consultant led ward rounds (Table 9).

Table 9: Categorising parental presence at consultant ward rounds from BadgerNet field Parent present on consultant ward round today?

Parent present on consultant ward round today?	NNAP category
Yes, parent was present for consultant ward round	Parent present
No, parent was not present for consultant ward round	Parent not present
No, no consultant ward round occurred today	Parent not present
Blank	Missing

BadgerNet data source

Details on daily parental presence on ward rounds are captured on BadgerNet in daily summary forms in the *Parent present on consultant ward round today?* field. A form can be created for each baby for each calendar day when they are an inpatient, and NNAP will consider all of the forms created.

Details on daily parental presence on ward rounds can also be captured in the BadgerNet EPR system under the clinical review section, where *Reason for Review* is listed as Ward Round and the *Consultant Ward Round* and *Parent Present at Review* fields are completed.

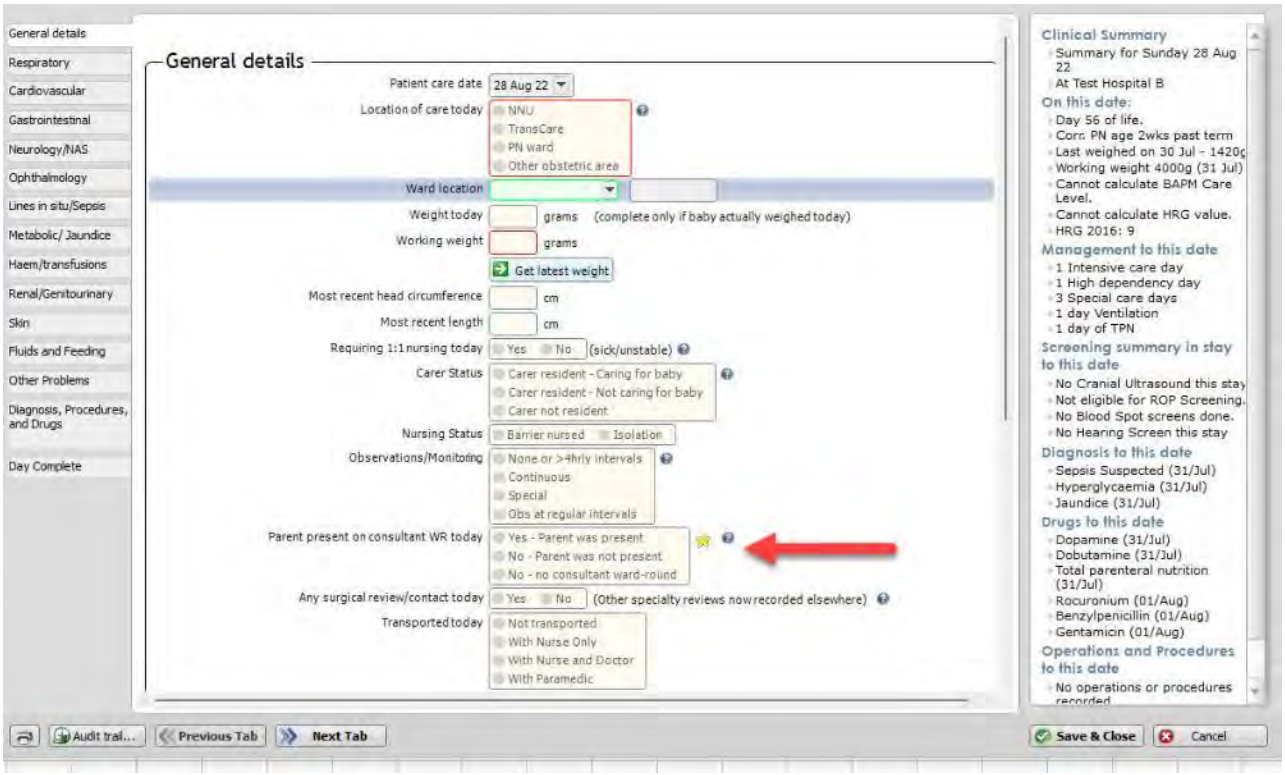


Figure 10: Daily summary, BadgerNet

6 Breastmilk feeding composite metric

Does a baby born at less than 34 weeks gestational age receive any of their own mother's milk:
a) At day 14 of life, and
b) At discharge to home from a neonatal unit?

Change to the audit measure for 2023 data year: New measure derived from existing individual measures already reported by the NNAP. No additional data collection.

NNAP standard

Developmental standard: None, benchmarking only.

Subject to outlier identification: No.

Inclusion criteria

Babies admitted to a neonatal unit whose birth gestation is between 22 and 33 weeks inclusive, and who survive to discharge or day 14.

Denominator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 33 weeks inclusive, and who survive to discharge or day 14 with non-missing breastmilk data (see Table 10).

Numerator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 33 weeks inclusive, and who survive to discharge or day 14, who receive any of their own mother's milk on day 14 of life and on their date of discharge. Presented as a proportion.

Cohort: Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

- Babies will be attributed to their location of care at 48 hours of life, which is intended as a proxy measure of the intention to provide ongoing care for a baby in a given neonatal unit.
- When a baby is in transit between units at 48 hours of life the baby will be assigned to the transferring hospital. When multiple admission locations exist at 48 hours of life, the baby will be attributed to the earliest associated admission time.

Deriving outcomes

Table 10: Classification of outcome for the breastmilk feeding composite metric based on breastmilk feeding at day 14 and breastmilk feeding at discharge

Composite metric		Breastmilk at discharge			
		adherent	**non-adherent**	**missing**	**ineligible**
Breastmilk day 14	**adherent**	adherent	non-adherent	missing	adherent
	non-adherent	non-adherent	non-adherent	non-adherent	non-adherent
	missing	missing	non-adherent	missing	missing
	ineligible	adherent	non-adherent	missing	ineligible

6.1 Breastmilk feeding at day 14

Does a baby born at less than 34 weeks' gestational age receive any of their own mother's milk at day 14 of life?

Change to the audit measure for 2023 data year: None. For 2022 reporting, the upper gestational age cut-off was increased from less than 32 weeks' to less than 34 weeks', in line with MatNeoSIP measurement.

NNAP standard

Developmental standard: Benchmarking only.

Subject to outlier identification: No.

Inclusion criteria

Babies born between 22 and 33 weeks gestational age who survive to their 14th day of life on a neonatal unit.

Denominator: Number of babies born between 22 and 33 weeks gestational age who survive to their 14th day of life on a neonatal unit and have complete feeding data on the 13th, 14th, or 15th day of life.

Numerator: Number of babies born between 22 and 33 weeks gestational age who receive any of their own mother's milk on day 14 of life.

Cohort: Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

- Babies will be attributed to their location of care at 48 hours of life, which is intended as a proxy measure of the intention to provide ongoing care for a baby in a given neonatal unit.
- When a baby is in transit between units at 48 hours of life the baby will be assigned to the transferring hospital. When multiple admission locations exist at 48 hours of life, the baby will be attributed to the earliest associated admission time.

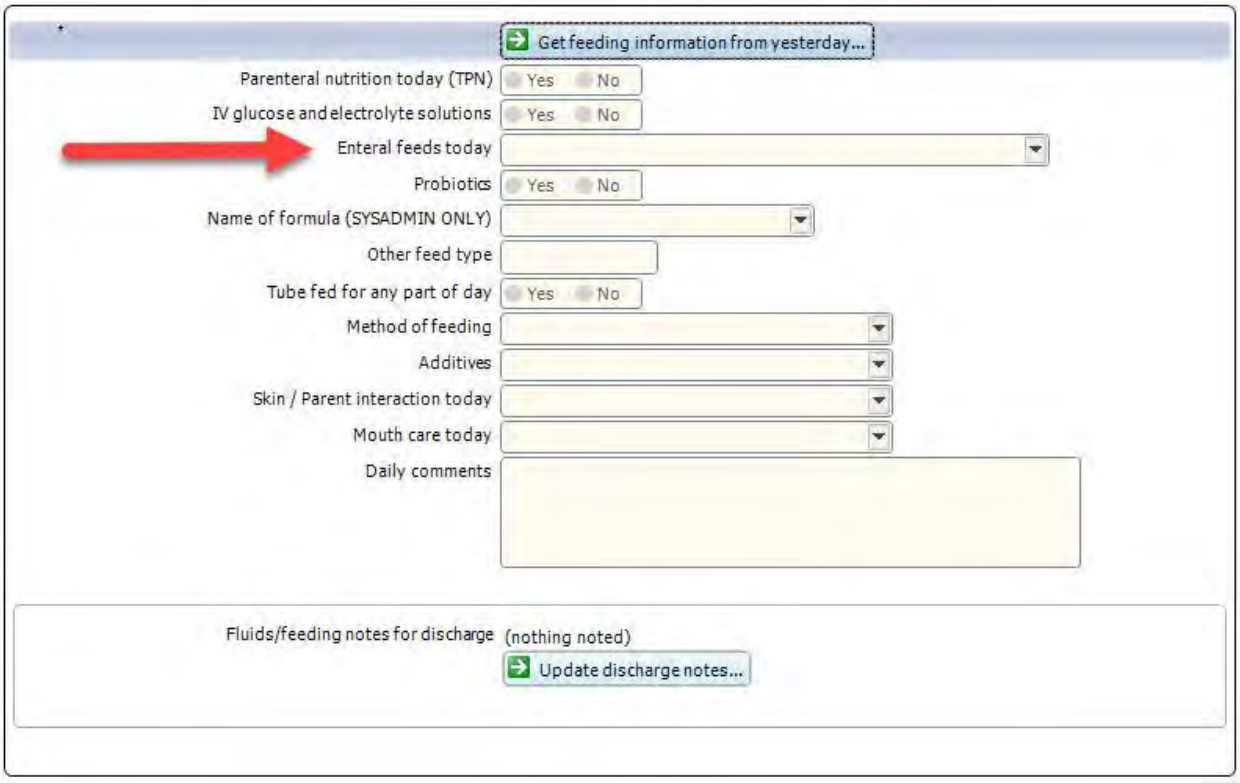
Deriving outcomes

Babies will be classified as meeting the NNAP standard if they are noted to have received any of the following types of enteral feed on their 14th day of life.

- Suckling at the breast
- Mother's fresh expressed breastmilk
- Mother's frozen expressed breastmilk

BadgerNet data source

The primary source for information on feeding at discharge is daily summary data on enteral feeds for the 14th day of neonatal care on the BadgerNet system. When enteral feeding data is missing for the 14th day, data from 13th or 15th day of care will be used instead (the most positive result will be used).



6.2 Breastmilk feeding at discharge home

Does a baby born at less than 34 weeks' gestational age receive any of their own mother's milk at discharge to home from a neonatal unit?

Change to the audit measure for 2023 data year: None. For 2022 reporting, the upper gestational age cut-off was increased from less than 32 weeks' to less than 34 weeks', in line with MatNeoSIP measurement.

NNAP standard

Developmental standard: At least eighty percent (80%) of babies born at less than 34 weeks' gestational age should receive at least some of their mother's milk at discharge home from the neonatal unit.

Source of standard: By consensus, in consultation with BAPM.

Subject to outlier identification: No.

Inclusion criteria

Babies born between 22 and 33 weeks gestational age who are discharged home alive.

Denominator: Number of babies born between 22 and 33 weeks gestational age who are discharged home alive with complete feeding data on their last or penultimate day of care.

Numerator: Number of babies born between 22 and 33 weeks gestational age who receive any of their own mothers milk at discharge.

Cohort: Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

Attribution will be to the neonatal unit of final discharge.

Deriving outcomes

Babies will be classified as meeting the NNAP standard if they are noted to have received any of the following types of enteral feed on their final day of care:

- Suckling at breast
- Mother's fresh expressed breast milk
- Mother's frozen expressed breast milk.

Data will be presented subdivided by rates of breastfeeding, and breastmilk feeding by bottle.

BadgerNet data source

The primary source for information on feeding at discharge is daily summary data on enteral feeds for the last day of neonatal care on the BadgerNet system. When enteral feeding data is missing for the final day, data from the penultimate day of care will be used instead.

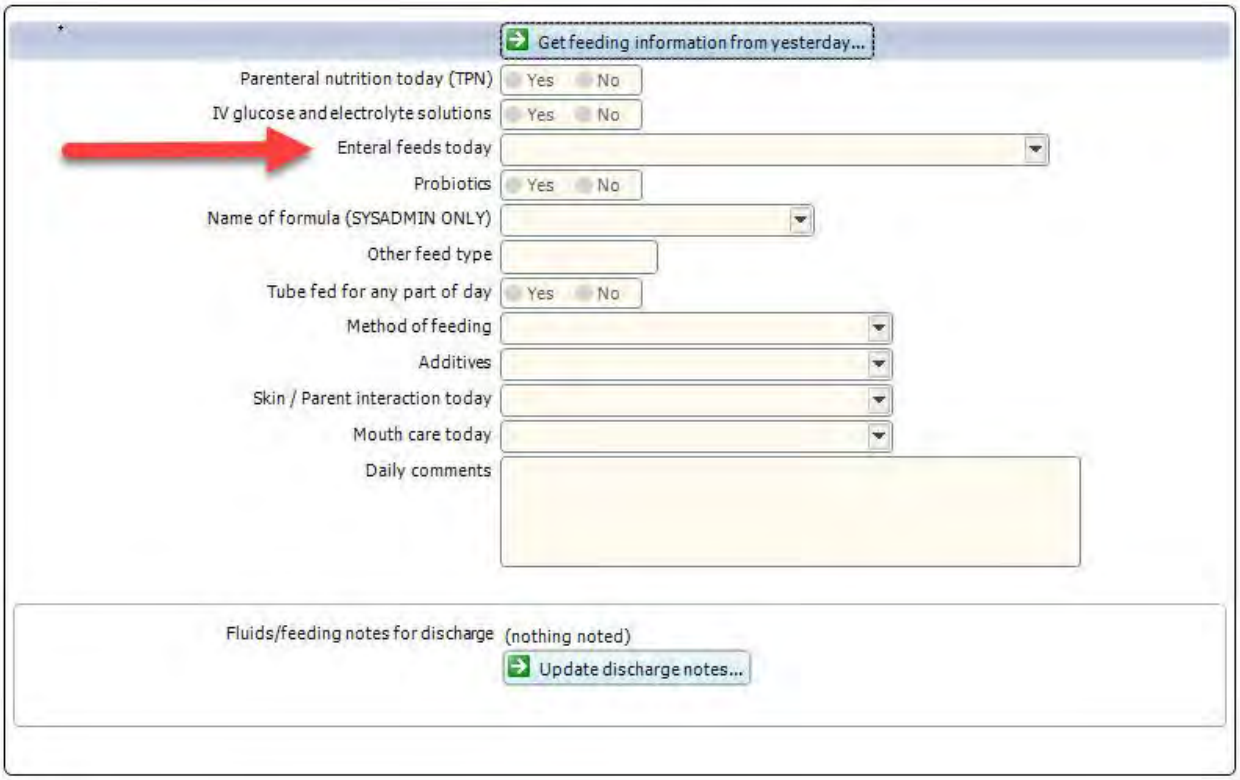


Figure 11: Daily summary form, BadgerNet

7 Follow-up at two years metric

Does a baby born at less than 30 weeks gestational age receive medical follow-up at two years gestationally corrected age (18-30 months' gestationally corrected acceptable age range)? [9]

Does a baby have complete results of a structured assessment recorded?[9]

Change to the audit measure for 2023 data year: None.

NNAP standard

Developmental standard: At least ninety percent (90%) of babies with two-year follow-up data entered.

Source of standard: NNAP Project Board

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

Babies admitted to a neonatal unit whose gestational age at birth is between 22 and 29 weeks inclusive, and who are not recorded as having died in their episodic data.

Denominator: Number of babies admitted to a neonatal unit whose gestational age at birth is between 22 and 29 weeks inclusive, and who are not recorded as having died in their episodic data.

Numerator: Number of babies admitted to a neonatal unit whose gestational age at birth is between 22 and 29 weeks inclusive, and who are not recorded as having died prior to discharge in their episodic data, who received a medical follow up at two years gestationally corrected age or died post discharge. Presented as a proportion.

Cohort: The eligible cohort runs from July to June each year, for babies who would have reached two years corrected age since the last annual report. Current and projected denominator periods are shown in Table 11.

Table 11: Categorising eligible babies for follow-up at two years of age

NNAP data year	Two-year assessment cohort: Time of birth (inclusive)
2023	July 2020 to June 2021
2024	July 2021 to June 2022
2025	July 2022 to June 2023

Attribution

Attribution will be to the neonatal unit of final discharge. When the unit of final neonatal discharge home cannot be ascertained, two-year data is assigned to the last known episode of neonatal care.

Deriving outcomes

Assessment data will be considered for analysis if it took place between 18 and 30 months corrected age for the infant. This is calculated using assessment date, date of birth and gestational age at birth. If the assessment date is not recorded, the infant will be classified as *Outside of date range*.

Table 12: Categorising two-year follow-up data

Two-year follow-up outcome form	NNAP category
Any two-year follow-up health data entered	Health data entered
Lost to follow-up	No health data entered: Lost to follow-up
Died post discharge	Health data entered
Responsibility of another unit	No health data entered: Not assessed for other reason
Local decision not to follow-up	No health data entered: Not assessed for other reason.
Empty follow-up form / No follow up form	No health data entered: No health data entered at all
Assessment occurred outside 18-30 months corrected gestational age	Assessment outside of range

BadgerNet data source

Data from the two-year follow-up form will be used to analyse assessment data. Which sections are used for each part of the analysis is indicated below by the coloured arrows:

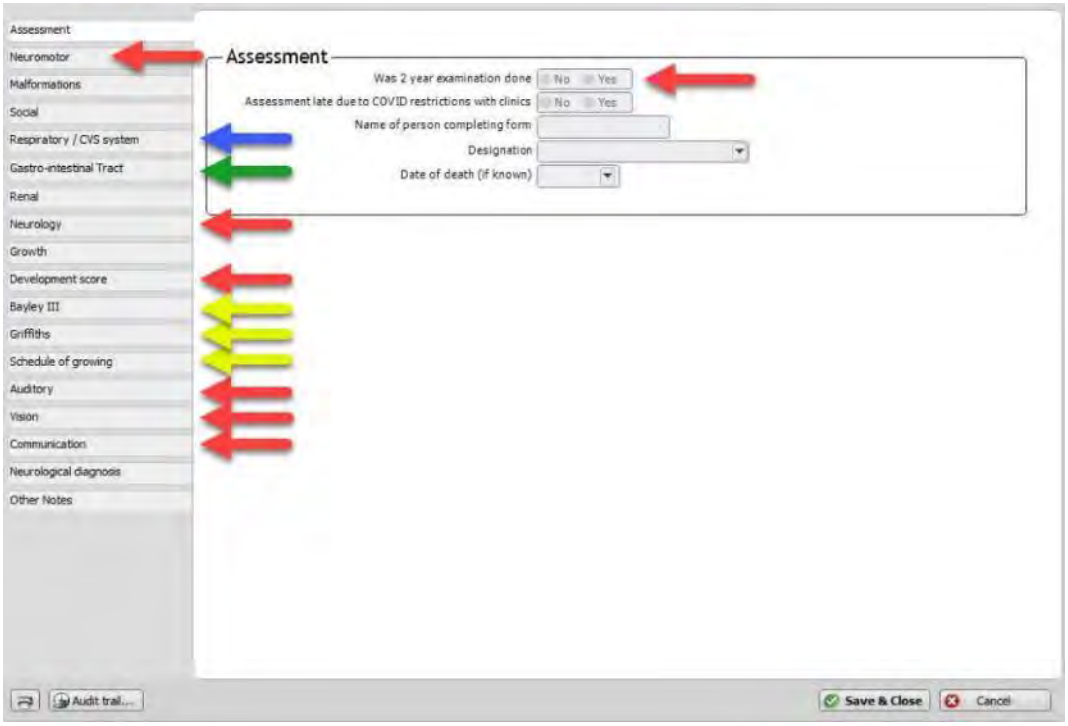


Figure 12: Two-year follow-up form, BadgerNet

Red: Assessment data and neurodevelopmental outcomes
Blue: Respiratory outcomes
Green: Gastrointestinal outcomes
Yellow: Standardised assessment data

8 On-time screening for retinopathy of prematurity

Does a baby born at less than 31 weeks gestational age, or weighing less than 1501g at birth undergo the first ROP screening according to the guideline? [10]

Change to the audit measure for 2023 data year: None. From 2022 reporting, the measure was amended in line with the latest ROP screening guideline.[10] Please refer to the 2021 measures guide for a definition of the previous measure.

NNAP standard

Developmental standard: Eighty percent (80%) of eligible babies should receive ROP screening within the recommended time windows for first screening.

Note that the Guidelines recommends that all (100%) of eligible babies should receive ROP screening within the recommended time windows for first screening.

Source of standard: NNAP Project Board consensus. National standard (RCPCH, *UK Screening of Retinopathy of Prematurity Guideline, 2022.*[10]

Subject to outlier identification: Yes, identification and management.

Comparison standard for outlier analysis: Treatment effect of 0%.

Table 13: ROP screening window

Gestational age at birth (completed weeks)	National guideline ROP screening window[10]
Less than 31 weeks' gestational age	31+0 and 31+6 weeks' postmenstrual age, or at 4 completed weeks' postnatal age (28-34 days), whichever is later.
At or after 31 weeks' gestational age, with birthweight less than 1501g	36 weeks' postmenstrual age or 4 completed weeks' postnatal age (28–34 days), whichever is sooner.

Inclusion criteria

Babies admitted to a neonatal unit whose birth gestation is between 22 and 30 weeks inclusive, or whose birth weight was less than 1501g and alive at the beginning of the national guideline screening window.

Denominator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 30 weeks inclusive, or whose birth weight was less than 1501g and alive at the beginning of the national guideline screening window.

Numerator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 30 weeks inclusive, or whose birth weight was less than 1501g and alive at the beginning of the national guideline screening window, who were screened in line with national guidance. Presented as a proportion.

Cohort: Babies who experienced their final neonatal discharge in the calendar year of analysis

Attribution

ROP screenings will be attributed to the unit completing the earliest screening within the screening window.

If a baby is not screened within the window, they are assigned to the neonatal unit of care at the time that the screening window closed, or the neonatal unit of final discharge when the infant was discharged before the closure of the screening window.

Babies who died before the end of screening window, and who do not have a record of being "Screened on time" will not be attributed to a unit.

Deriving outcomes

ROP status will be derived from the ad–hoc and daily summary of care sections of BadgerNet to confirm if a screening took place and whether it took place during the NNAP ROP screening window (Table 14).

Table 14: ROP screening categories

These categories are totalled to give 'Any screen':			No screening data
Within ROP screening window	**Only before ROP screening window opened***	**Only after ROP screening window**	**No ad-hoc ROP form or ROP screen data on daily care summary**
Screened on time	Screened early	Screened late	No screening data

**Babies screened both before and after the window, but not within, are classified as "Screened early".*

BadgerNet data source

Details on ROP screenings are captured on BadgerNet via ad-hoc forms for ROP screening and from the daily summary form when *ROP screen today* is answered *Yes*. Where evidence of ROP screening is available from both sources for the same day ad-hoc screening data will be used preferentially.

Dates from both the ad-hoc and the daily summary forms are used to determine the date of the screening. The time of the screen is not taken into account when calculating ROP screening windows and screens.

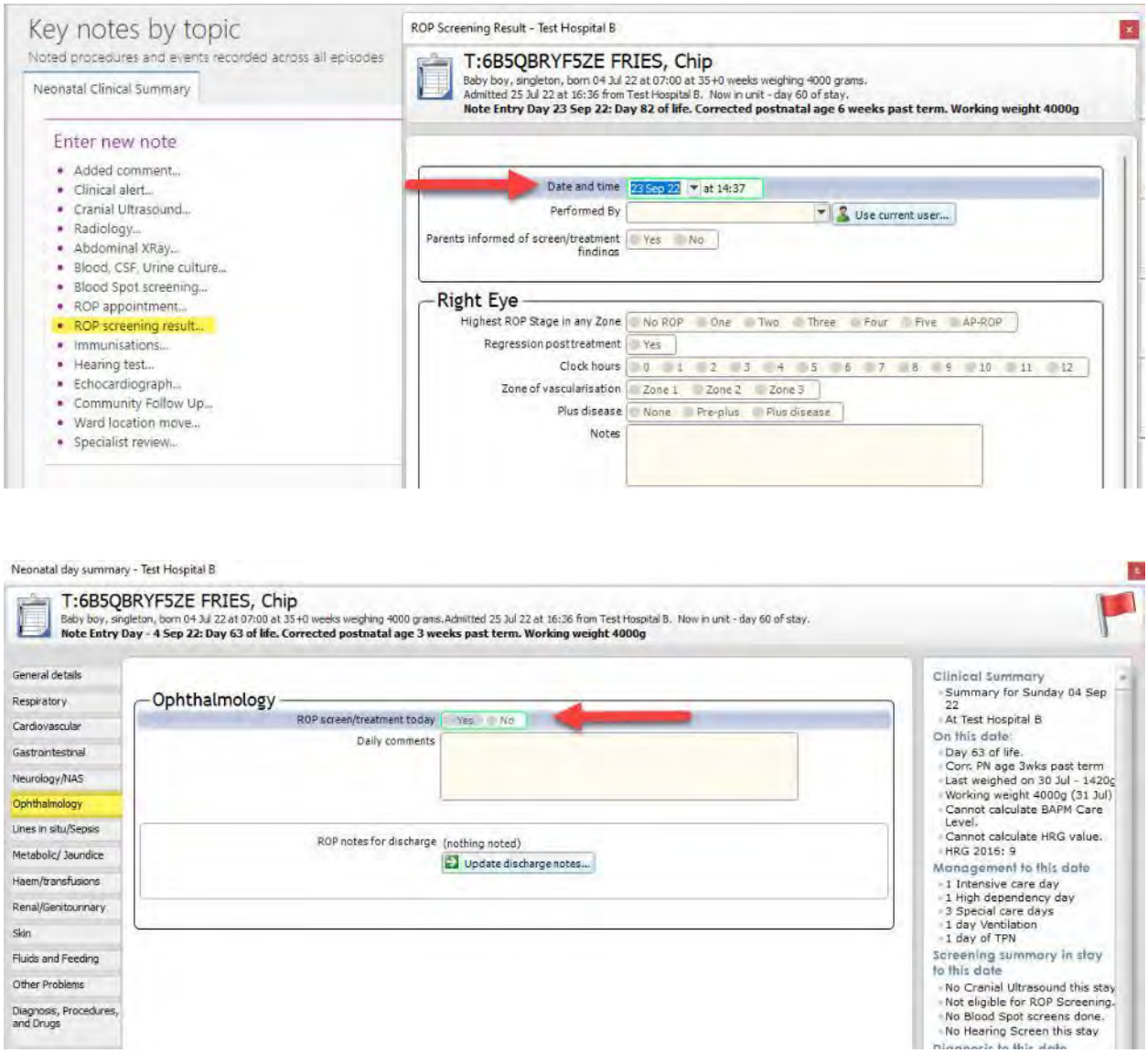


Figure 13: Ad-hoc form for ROP screening (top) and daily summary form (bottom), BadgerNet

9 Nurse staffing on neonatal units

What proportion of nursing shifts are numerically staffed according to guidelines and service specification?[3, 11, 12]

Note: Shifts are based on corresponding level of cot occupancy calculated by BadgerNet system.

Change to the audit measure for 2023 data year: None. From 2022 reporting, measures 2 and 3 were removed, to focus solely on the proportion of shifts numerically staffed according to guidelines and service specification.

NNAP standard

Developmental standard: 100% of shifts staffed according to guidelines and service specification.

Subject to outlier identification: No.

Inclusion criteria

Number of shifts (data collection instrument and measure based on a two-shift model of each calendar day).

Denominator: Number of shifts with complete cot occupancy and nursing numbers.

Numerator: Number of shifts where nurse staffing met or exceeded service specification rules (1:1 intensive care; 1:2 high dependency care; 1:4 special care; additional shift coordinator)[3, 12].

Cohort: Shifts within calendar year of analysis.

Attribution

Attribution will be to the neonatal unit.

Deriving outcomes

A “nurse” is a member of non-medical staff with an allocated patient workload, or acting as a coordinator, with or without Nursing and Midwifery Council (NMC) registration, with or without a qualification in speciality. Staff members without allocated patients, such as housekeepers, research nurses, nurses in primarily educational roles are specifically excluded.

When entering data about partially worked day shifts, units should enter early or late shifts as follows: where a nurse is only present for an “early” or “late” part of a day shift, record as 0.5 shift.

Any shifts with no cot occupancy or nurse numbers data will be removed from the measure.

Additionally, any units with less than or equal to 50% data completeness across all their entered shifts will be removed from the measure. This completeness is assessed based on completion of the “Registered Nurses, qualified in specialty” field.

Use the guidance *Safe, sustainable and productive staffing: An improvement resource for neonatal care* to support data completion.

BadgerNet data source

Data from the Nursing numbers update form (Figure 14) in BadgerNet will be used for this measure. The Nursing numbers update form is found within the Unit report section.

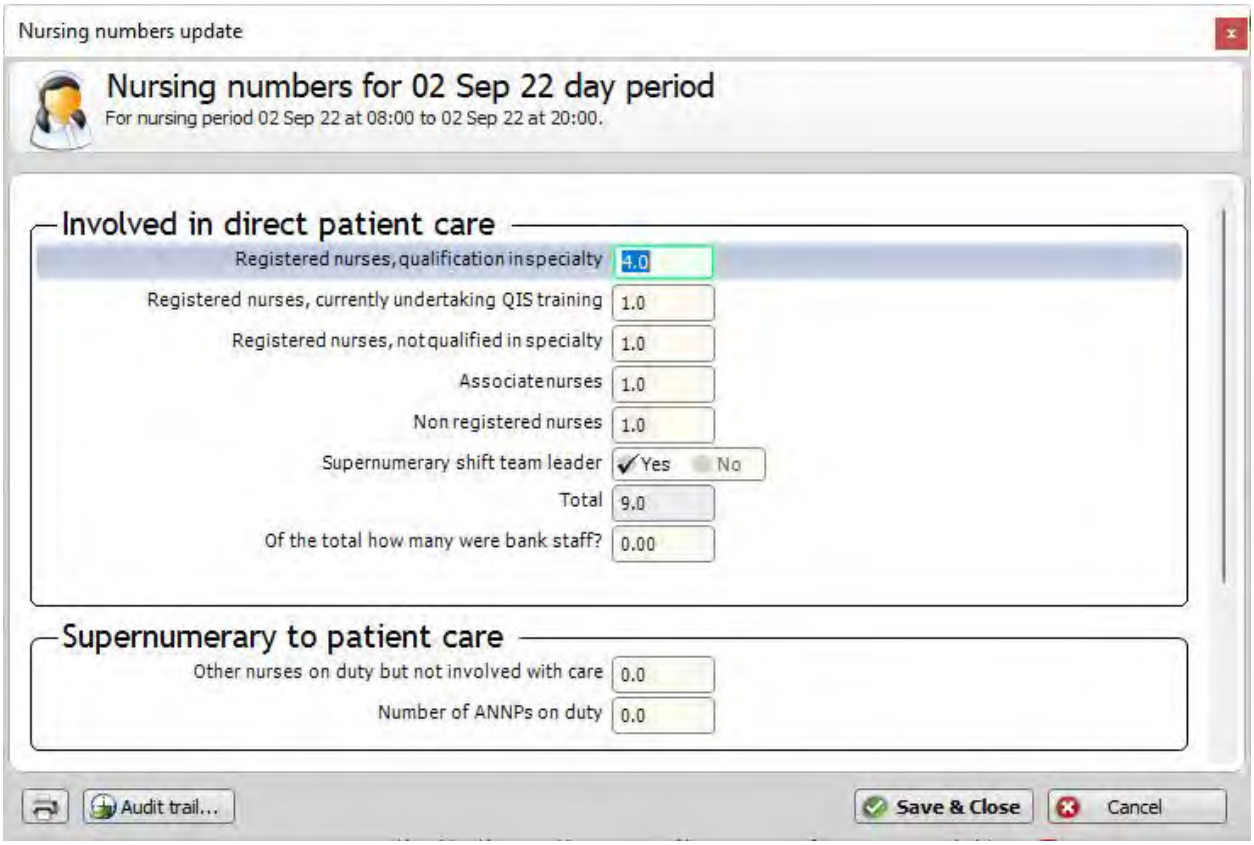


Figure 14: Nursing numbers update form, BadgerNet

Data entered into the form is summarised in the Neonatal Unit Nursing Numbers report (Figure 15).

Period		Nurses caring for patients							Cot occupancy						Nurses required		QIS Required (IC & HD)		
		With qual.	Assoc	Undertaking QIS	Without qual.	Not Reg.	Team Leader	Total	Bank Staff	IC	HD	SC	Admissions	Discharges	BAPM Recommends	Difference		Toolkit recommends	Difference
01 Sep 22	Day	8	1	1	1	1	1	**13**	3	0	0	0	0	0	**1**	$12^{(0)}$ (1,200%)		0	9
	Night	8	1	1	1	1	1	**13**	3	0	0	0	0	0	**1**	$12^{(0)}$ (1,200%)		0	9
02 Sep 22	Day	4	1	1	1	1	1	**9**	0	0	0	0	0	0	**1**	$8^{(0)}$ (800%)		0	5
	Night	Update...								0	0	0	0	0	**1**	$-1^{(-1)}$ (-100%)		0	0
03 Sep 22	Day	Update...								0	0	0	0	0	**1**	$-1^{(-1)}$ (-100%)		0	0
	Night	Update...								0	0	0	0	0	**1**	$-1^{(-1)}$ (-100%)		0	0

Figure 15: Neonatal unit nursing numbers, BadgerNet

10 Non-invasive breathing support

What proportion of babies born at less than 32 weeks' gestation only receive non-invasive breathing (or respiratory) support during the first week of life?*

**Invasive respiratory support is defined as that delivered through an endotracheal tube.*

Change to the audit measure for 2023 data year: None. New measure from 2022.

NNAP standard

Developmental standard: None

Subject to outlier identification: Identification only, no management process.

Comparison standard for outlier analysis: Treatment effect of 0%.

Inclusion criteria

Babies admitted to a neonatal unit whose birth gestation is between 22 and 31 weeks inclusive who survived to day 8 of life and did not have surgery in the first week of life. Episodes in the first week of life will be considered for analysis.

Denominator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 31 weeks inclusive, who survived to day 8 of life, who have complete feeding data each of their first 7 days, and who did not have surgery in the first week of life.

Numerator: Number of babies admitted to a neonatal unit whose birth gestation is between 22 and 31 weeks inclusive who survived to day 8 of life and did not have surgery in the first week of life, who only received non-invasive respiratory support during the first week of life. Presented as a proportion.

Cohort: Babies who experienced their first admission in the calendar year of analysis.

Attribution

Results will be attributed to the hospital and network of birth.

When the place of birth is listed as *Home* or *Transit* the hospital and network will be assigned as the provider of their earliest episode. When the place of birth is the site of a closed unit, the hospital will be assigned as *Other* and the network will be assigned as the network responsible for that location.

Deriving outcomes

Outcomes will be derived from the "respiratory support" field of the day summary forms from the first seven days of a baby's care. The numerator is babies who only receive non-invasive respiratory support ("*no ventilation/no CPAP*" or "*non-invasive support (inc. CPAP)*") on all of the first seven days of life.

Babies born at or after 23:00 hours will have respiratory data from their first day of life imputed to match respiratory data from their second day of life, if data from their first day of life is missing. This is to account for babies born the day before their first admission to a neonatal unit.

Presenting the data

Type and duration of respiratory support unit and network results are balanced on gestational age. Balancing is a process that compares the babies at each unit to babies from the national population whose results are weighted to create the same gestational age mix as the unit of comparison. The weighted national result (referred to as the “balanced proportion”) is then compared to the unit’s result (referred to the “observed proportion”), with the difference between their proportions referred to as the “treatment effect”. A positive treatment effect indicates that babies at the unit would have been more likely to receive only non-invasive respiratory support had they been treated elsewhere, and a negative treatment effect indicates that they would have been less likely to receive only non-invasive respiratory support elsewhere.

BadgerNet data source

Details on type of respiratory support are captured on BadgerNet on the Day summary form, indicating type of respiratory support provided on the day.

Glossary of terms and abbreviations

BAPM	The British Association for Perinatal Medicine improves standards of perinatal care by supporting all those involved in perinatal care to optimise their skills and knowledge, promote high quality, safe and innovative practice, encourage research, and speak out for the needs of babies and their families. https://www.bapm.org/
BPD	Bronchopulmonary dysplasia
Bliss	Bliss is a national charity for babies born premature or sick. It exists to give every baby born premature or sick in the UK the best chance of survival and quality of life. Bliss supports families, campaigns for change, supports professionals, and enables life-changing research. https://www.bliss.org.uk
DCC	Deferred cord clamping
GIRFT	Getting It Right First Time (GIRFT) is a national programme designed to improve the treatment and care of patients through in-depth review of services, benchmarking, and presenting a data-driven evidence base to support change[13].
HQIP	The Healthcare Quality Improvement Partnership (HQIP) aims to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. https://www.hqip.org.uk/
HRG	Healthcare resource group: Standard groupings of clinically similar treatments which use common levels of healthcare resource.
Hyperthermia	A body temperature more than 37.5°C
Hypothermia	A body temperature less than 36.5°C
LNU	Local neonatal units (LNUs) provide neonatal care for their own catchment population, except for the sickest babies. They provide all categories of neonatal care, but they transfer babies who require complex or longer-term intensive care to a NICU, as they are not staffed to provide longer-term intensive care. Most babies over 27 weeks gestational age will usually receive their full care, including short periods of intensive care, within their LNU. Some networks have agreed variations on this policy, due to local requirements. Some LNUs provide high dependency care and short periods of intensive care for their network population. LNUs may receive transfers from other neonatal services in the network, if these fall within their agreed work pattern[14].
MatNeoSIP	The Maternity and Neonatal Safety Improvement Programme (MatNeoSIP), formerly known as the Maternal and Neonatal Health Safety Collaborative, is the programme supporting improvement in the quality and safety of maternity and neonatal units across England. https://www.england.nhs.uk/mat-transformation/maternal-and-neonatal-safety-collaborative/
MBRRACE-UK	Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK. https://www.npeu.ox.ac.uk/mbrrace-uk

NCAPOP	National Clinical Audit and Patient Outcomes Programme
NEC	Necrotising enterocolitis
NHSE	NHS England
NICE	National Institute for Health and Care Excellence
NICU	Neonatal intensive care units (NICUs) are sited alongside specialist obstetric and feto-maternal medicine services and provide the whole range of medical neonatal care for their local population, along with additional care for babies and their families referred from the neonatal network. Many NICUs are co-located with neonatal surgery services and other specialised services. Medical staff in a NICU should have no clinical responsibilities outside the neonatal and maternity services[14].
NMPA	The National Maternity and Perinatal Audit is a national clinical audit of NHS maternity services in England, Scotland and Wales. The audit, commissioned by HQIP, is led by the Royal College of Obstetricians and Gynaecologists in partnership with the Royal College of Midwives (RCM, the Royal College of Paediatrics and Child Health (RCPCH) and the London School of Hygiene and Tropical Medicine (LSHTM). www.maternityaudit.org.uk
NNAP	National Neonatal Audit Programme
Normothermia	A body temperature between 36.5°C and 37.5°C
ODN	Operational delivery network: In England, managed clinical networks for the coordination of neonatal critical care.
Outlier	A result that is statistically above or below expected performance. The NNAP defines outliers in four categories: • outstanding: three or more standard deviations above expected performance • excellent: between two and three standard deviations above expected performance • alert: between two and three standard deviations below expected performance • alarm: three or more standard deviations below expected performance.
PDSA	Plan, do, study, act
Perinatal	The period before and immediately after birth, here defined as the time from fetal viability up to 28 days after birth.
PERIPrem	Perinatal Excellence to Reduce Injury in Premature Birth https://www.weahsn.net/our-work/transforming-services-and-systems/periprem/
PReCePT	The Prevention of Cerebral Palsy in PreTerm Labour. https://www.weahsn.net/our-work/transforming-services-and-systems/precept/

Preterm	Preterm is defined by the World Health Organisation as a baby born alive before 37 weeks of pregnancy are completed. This definition is sub-categorised by gestational age: • extremely preterm (less than 28 weeks) • very preterm (28 to 32 weeks) • moderate to late preterm (32 to 37 weeks).
QI	Quality improvement
RCPCH	The Royal College of Paediatrics and Child Health (RCPCH) was founded in 1996 and now has over 17,000 members across the world. The RCPCH plays a major role in postgraduate medical education, professional standards, research and policy. https://www.rcpch.ac.uk
RCOphth	Royal College of Ophthalmologists
ROP	Retinopathy of prematurity
SCU	Special care units (SCUs) provide special care for their own local population. Depending on arrangements within their neonatal network, they may also provide some high dependency services. In addition, SCUs provide a stabilisation facility for babies who need to be transferred to a neonatal intensive care unit (NICU) for intensive or high dependency care, and they also receive transfers from other network units for continuing special care[14].

Appendix 1: “Pathogens” in the NNAP

Bacterial, fungal and yeast positive blood cultures reported to the NNAP in 2022 for the late onset bloodstream infection measure have been classified as shown below into organisms whose growth would be regarded as indicative of a bloodstream infection without further clinical evidence of infection (clearly pathogenic), and into a list of other organisms. This list of organisms included for NNAP reporting is available below. The NNAP are grateful to Dr Jim Gray, Consultant Microbiologist at Birmingham Women’s and Children’s NHS Foundation Trust, who kindly reviewed organisms reportedly cultured in blood, and helped classify them into ‘clearly pathogenic’ and ‘other’ organisms.

For more information, see Fraser C, Muller-Pebody B, Blackburn R, Gray J, Oddie SJ, Gilbert RE, Harron K. Linking surveillance and clinical data for evaluating trends in bloodstream infection rates in neonatal units in England. PLoS One. 2019 Dec 12;14(12):e0226040. doi: 10.1371/journal.pone.0226040.eCollection 2019.

Clearly Pathogenic Organisms		
Acinetobacter Baumanii	Enterobacter Sp	Salmonella Aba
Acinetobacter Baumannii	Enterobacter Sp.	Salmonella Agama
Aeromonas Caviae	Enterococcus Avium	Salmonella Ajiobo
Aeromonas Hydrophila	Enterococcus Casseliflavus	Salmonella Apapa
Aeromonas Salmonicida	Enterococcus Durans	Salmonella Arizonae
Aeromonas Sobria	Enterococcus Faecalis	Salmonella Brandenburg
Aeromonas Sp	Enterococcus Faecalis	Salmonella Colindale
Anaerococcus Prevotii	Enterococcus Faecium	Salmonella Cotham
Aspergillus	Enterococcus Gallinarum	Salmonella Cubana
Aspergillus Fumigatus	Enterococcus Hirae	Salmonella Djugu
Aspergillus Niger	Enterococcus Raffinosus	Salmonella Dublin
Aspergillus Sp	Enterococcus Sp	Salmonella Enteritidis
B Haemolytic Streptococci	Enterococcus Sp.	Salmonella Gold-Coast
Bacteroides Capillosus	Escherichia	Salmonella Hadar
Bacteroides Distasonis	Escherichia Coli	Salmonella Heidelberg
Bacteroides Fragilis	Escherichia Hermannii	Salmonella Hofit
Bacteroides Ovatus	Escherichia Sp	Salmonella Hull
Bacteroides Sp	Escherichia Vulneris	Salmonella Infantis
Bacteroides Uniformis	Fusobacterium Necrophorum	Salmonella Kedougou
Bacteroides Vulgatus	Fusobacterium Nucleatum	Salmonella Kiambu
C. Koseri	Fusobacterium Sp	Salmonella Kibusi
Campylobacter Fetus	Gardnerella	Salmonella Kintambo
Campylobacter Jejuni	Gardnerella Vaginalis	Salmonella Kisarawe
Campylobacter Sp	Gbs	Salmonella Matopeni
Campylobacter Ureolyticus	Group B Streptococcus	Salmonella Mississippi
Candida	Group G Streptococcus	Salmonella Monschaui
Candida Albicans	Haemophilus Influenzae	Salmonella Montevideo
Candida Ciferrii	Hafnia Alvei	Salmonella Muenchen
Candida Dubliniensis	Hansenula Sp	Salmonella Muenster
Candida Fabianii	Klebsiella	Salmonella Newport
Candida Famata	Klebsiella Aerogenes	Salmonella Oranienburg
Candida Glabrata	Klebsiella Ornithnolytica	Salmonella Poona

Candida Guilliermondii	Klebsiella Oxytoca	Salmonella Reading
Candida Haemulonis	Klebsiella Planticola	Salmonella Saphra
Candida Krusei	Klebsiella Pneumoniae	Salmonella Senftenberg
Candida Lusitaniae	Klebsiella Pneumoniae Subsp Ozenae	Salmonella Sinstorf
Candida Parapsilosis	Klebsiella Sp	Salmonella Sp
Candida Sp	Klebsiella Sp.	Salmonella Sp.
Candida Sp.	Kluyvera Sp	Salmonella Stanley
Candida Tropicalis	Leclercia Adecarboxylata	Salmonella Tel-El-Kebir
Cedecea Lapagei	Listeria Monocytogenes	Salmonella Typhi And Paratyphi
Citrobacter	Listeria Sp	Salmonella Typhimurium
Citrobacter Amalonaticus	Malassezia Furfur	Salmonella Unnamed
Citrobacter Braakii	Malassezia Pachydermatis	Salmonella Virchow
Citrobacter Diversus	Malassezia Sp	Salmonella Vitkin
Citrobacter Farmeri	Morganella Morganii	Salmonella Wichita
Citrobacter Freundii	Mrsa	Serratia Liquefaciens
Citrobacter Koseri	Neisseria Meningitidis	Serratia Marcescens
Citrobacter Sp	Pantoea Agglomerans	Serratia Odorifera
Citrobacter Sp.	Pantoea Septica	Serratia Plymuthica
Clostridium Beijerinckii	Pantoea Sp	Serratia Proteamaculas
Clostridium Bifermentans	Pasteurella	Serratia Rubidaea
Clostridium Butyricum	Pasteurella Haemolytica	Serratia Sp
Clostridium Paraputrificum	Pasteurella Multocida	Serratia Sp.
Clostridium Perfringens	Pasteurella Pneumotropica	Shigella Flexneri
Clostridium Septicum	Pasteurella Sp	Shigella Sonnei
Clostridium Sordelli	Pasteurella Sp.	Staphylococcus Aureus
Clostridium Sp	Peptostreptococcus	Stellatoidea
Clostridium Sporogenes	Peptostreptococcus Asaccharolyticus	Streptococcus Agalactiae
Clostridium Tertium	Peptostreptococcus Magnus	Streptococcus Anaerobic
Coccidioides Sp	Prevotella Bivia	Streptococcus Anginosus
Coliform	Prevotella Buccalis	Streptococcus Bovis
Cryptococcus Albidus	Prevotella Oralis	Streptococcus Constellatus
Cryptococcus Sp	Proteus Mirabilis	Streptococcus Faecalis
E.Coli	Proteus Penneri	Streptococcus Group A Stem
Enterobacter	Proteus Sp	Streptococcus Group B Stem
Enterobacter Aerogenes	Proteus Sp.	Streptococcus Group C Stem
Enterobacter Agglomerans	Proteus Vulgaris	Streptococcus Group D Stem
Enterobacter Agglomerans	Providencia Alcalifaciens	Streptococcus Group G Stem
Enterobacter Amnigenus	Providencia Stuartii	Streptococcus Milleri
Enterobacter Asburiae	Pseudomonas Aeruginosa	Streptococcus Milleri Group
Enterobacter Cloacae	Raoultella Planticola	Streptococcus Pneumoniae
Enterobacter Cloacae Complex	Raoultella Planticola	Streptococcus Pyogenes
Enterobacter Gergoviae	Raoultella Sp	Veillonella Atypica
Enterobacter Hormaechei	Raoultella Terrigena	Veillonella Named
Enterobacter Intermedium	Rhodotorula	Yeasts
Enterobacter Intermedius	Rhodotorula Rubra	Yeasts (Other)
Enterobacter Kobei	Rhodotorula Sp	Yersinia Enterocolitica
Enterobacter Sakazakii	S. Aureus	Yersinia Sp.

Other Organisms		
Abiotrophia	Corynebacterium Striatum	Ochrobactrum Sp
Abiotrophia Adiacens	Corynebacterium Xerosis	Paenibacillus Amylolyticus
Abiotrophia Adjacens	Coryneform Bacilli	Paenibacillus Glucanolyticus
Abiotrophia Defectiva	Delftia Acidovorans	Paenibacillus Pabuli
Achromobacter Sp	Dermabacter Hominis	Paenibacillus Sp
Achromobacter Xylosoxidans	Dermacoccus Sp	Parabacteroides Distasonis
Acidovorax Temperans	Diphtheroids	Paracoccus Sp
Acinetobacter Anitratus	Eggerthella Lenta	Paracoccus Yeeii
Acinetobacter Calcoaceticus	Eikenella Corrodens	Pediococcus Acidilactici
Acinetobacter Haemolyticus	Elizabethkingia Miricola	Penicillium Sp
Acinetobacter Johnsonii	Elizabethkingia Sp	Peptococcus Sp
Acinetobacter Junii	Eubacterium Lentum	Phialophora
Acinetobacter Lwoffii	Exophiala Sp.	Propionibacterium Acnes
Acinetobacter Parvus	Flavimonas Oryzihabitans	Propionibacterium Freudenreichii
Acinetobacter Radioresistens	Flavobacterium Sp.	Propionibacterium Sp
Acinetobacter Sp	Gemella Haemolysans	Proprionebacterium Acnes
Acinetobacter Sp.	Gemella Morbilarum	Pseudoclavibacter Sp
Acinetobacter Ursingii	Gemella Morbillorum	Pseudomonas Alcaligenes
Actinomyces	Geotrichum Sp	Pseudomonas Fluorescens
Actinomyces Bovis	Globicatella Sanguis	Pseudomonas Luteola
Actinomyces Cardiffensis	Gordonia Bronchialis	Pseudomonas Oleovorans
Actinomyces Naeslundii	Gordonia Sp	Pseudomonas Oryzihabitans
Actinomyces Neuii	Gram Negative Bacilli	Pseudomonas Paucimobilis
Actinomyces Odontolyticus	Granulicatella Adiacens	Pseudomonas Putida
Actinomyces Oris	Granulicatella Elegans	Pseudomonas Sp
Actinomyces Sp	Haematobacter Sp	Pseudomonas Sp.
Actinomyces Sp.	Haemophilus	Pseudomonas Stutzeri
Actinomyces Viscosus	Haemophilus Aphrophilus	Pseudoxanthomonas Kaohsiungensis
Aerococcus Sp	Haemophilus Haemolyticus	Psychrobacter Phenylpyruvicus
Aerococcus Urinae	Haemophilus Parahaemolyticus	Rahnella Named
Aerococcus Viridans	Haemophilus Parainfluenzae	Rahnella Sp
Agrobacterium Tumefaciens	Haemophilus Paraphrohaemolyticus	Ralstonia Pickettii
Alcaligenes Faecalis	Haemophilus Sp	Ralstonia Sp.
Alcaligenes Sp	Haemophilus Sp.	Rhizobium Radiobacter
Alpha Haemolytic Streptococcus	Kingella Denitrificans	Rhodococcus
Alternaria Sp.	Kingella Kingae	Rhodococcus Bronchialis
Anaerobes (Not Specified)	Kingella Sp	Rhodococcus Sp
Anitratus	Kocuria Kristinae	Roseomonas Gilardii
Arcanobacterium Haemolyticum	Kocuria Rhizophila	Roseomonas Mucosa
Arthrobacter Sp	Kocuria Rosea	Roseomonas Sp
Aurantimonas Altamirensis	Kocuria Sp	Rothia Aeria
Bacillus	Kocuria Species	Rothia Dentocariosia
Bacillus Cereus	Kocuria Varians	Rothia Sp
Bacillus Circulans	Kytococcus Schroeteri	Rothia Spp
Bacillus Licheniformis	Lactobacillus	Ruminococcus Gnavus
Bacillus Pumilus	Lactobacillus Crispatus	Scopulariopsis Brevicaulis
Bacillus Silvestris	Lactobacillus Fermentum	Sphingobacterium Multivorum

Bacillus Sp	Lactobacillus Gasseri	Sphingomonas
Bacillus Sp.	Lactobacillus Jensenii	Sphingomonas Paucimobilis
Bacillus Subtilis	Lactobacillus Lactis	Sphingomonas Sp
Bifidobacterium	Lactobacillus Paracasei	Staph Saprophyticus
Bifidobacterium Adolescentis	Lactobacillus Rhamnosus	Staphylococcus Capitis
Bifidobacterium Breve	Lactobacillus Sp	Staphylococcus Coagulase Negative
Bifidobacterium Catenulatum	Lactobacillus Sp.	Staphylococcus Epidermidis
Bifidobacterium Longum	Lactococcus Cremoris	Staphylococcus Haemolyticus
Bifidobacterium Sp	Lactococcus Garvieae	Staphylococcus Hominis
Brevibacillus Parabrevis	Lactococcus Lactis	Staphylococcus Lugdunensis
Brevibacterium	Lactococcus Sp	Staphylococcus Pettenkoferi
Brevibacterium Casei	Lactococcus Sp.	Staphylococcus Simulans
Brevibacterium Sp	Leuconostoc Sp	Staphylococcus Sp
Brevundimonas Diminuta	Lysinibacillus Sp	Staphylococcus Sp.
Brevundimonas Sp	Mallassezia Furfur	Staphylococcus Vitulinus
Brevundimonas Vesicularis	Massilia Timonae	Staphylococcus Warneri
Burkholderia Capecia	Methylobacterium Sp	Stenotrophomonas Acidaminiphila
Burkholderia Cepacia	Microbacterium Aurum	Stenotrophomonas Maltophilia
Burkholderia Gladioli	Microbacterium Paraoxydans	Stenotrophomonas Sp
Capnocytophaga	Microbacterium Sp	Stephanoascus Ciferrii
Chryseobacterium Indologenes	Micrococcus	Steptococcus Mutans
Chryseobacterium Meningosepticum	Micrococcus Luteus	Stomatococcus Mucilaginosus
Chryseobacterium Sp	Micrococcus Lylae	Stomatococcus Sp
Chryseobacterium Sp.	Micrococcus Sp	Streptococcus Alactolyticus
Chryseomonas Indologenes	Micrococcus Sp.	Streptococcus Alpha And Non-Haemolytic
Collinsella Aerofaciens	Micrococcus Varians	Streptococcus Cristatus
Comamonas Acidovorans	Microsporum Sp	Streptococcus Gordonii
Comamonas Testosteroni	Mixed Growth	Streptococcus Infantarius Subsp Nov
Cons	Moraxella Catarrhalis	Streptococcus Infantis
Cons (Mixed)	Moraxella Lacunata	Streptococcus Intermedius Group
Corynebacterium	Moraxella Nonliquefaciens	Streptococcus Lutetiensis
Corynebacterium Afermentans	Moraxella Osloensis	Streptococcus Mitis
Corynebacterium Amycolatum	Moraxella Sp	Streptococcus Oralis
Corynebacterium Aurimucosum	Moraxella Sp.	Streptococcus Other Group
Corynebacterium Auris	Mycobacterium Sp.	Streptococcus Parasinguinis
Corynebacterium Coyleae	Neisseria Cinerea	Streptococcus Peroris
Corynebacterium Diphtheriae	Neisseria Flavescens	Streptococcus Pseudoporcinus
Corynebacterium Imitans	Neisseria Lactamica	Streptococcus Salivarius
Corynebacterium Jeikeium	Neisseria Mucosa	Streptococcus Sanguis
Corynebacterium Minutissimum	Neisseria Perflava	Streptococcus Sobrinus
Corynebacterium Mucifaciens	Neisseria Polysacchareae	Streptococcus Sp
Corynebacterium Propinquum	Neisseria Sicca	Streptococcus Sp.
Corynebacterium Pseudodiphtheriticum	Neisseria Sp	Streptococcus Thermophilus
Corynebacterium Simulans	Neisseria Subflava	Streptococcus Vestibularis
Corynebacterium Sp	Oceanobacillus Profundus	Streptococcus Viridans
Corynebacterium Sp.	Ochrobactrum Anthropi	

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